
MEDICAL REPOSITORY,

FOR

NOVEMBER AND DECEMBER, 1804, AND JANUARY, 1805.

ARTICLE I.

ANALYSIS of TURRIANO'S TREATISE *on the PLAGUE of MESSINA, in SICILY, 1743 ; and an Account of the Use of the Rack and Torture to prove the Distemper contagious: In a Communication from Dr. S. L. MITCHILL to Dr. J. R. B. RODGERS, Health-Officer of the Port of New-York.*

YOU will probably give a welcome reception to the following account of some Italian books, bought lately in Naples by Dr. Seaman, for the library of Dr. Miller. They afford some very valuable information, and show that, in the Mediterranean cities, the contagionists had a hard task to maintain their hypothesis more than half a century ago.

The city of Messina, in Sicily, suffered a dreadful visitation of sickness in 1743. An account of it was written by HORACE TURRIANO, and published at Naples, in 1745, under the title of *Memoria Istorica del Contagio della Citta di Messina del Anno 1743*. Turriano's book contains several particulars well worthy of notice. He says that the spring of the year which preceded the pestilence was rough and cold. Southerly winds prevailed, which were stormy and cloudy. The cold at the time of the equinox was scarcely less than that of the preceding winter. But the winds continued to blow from the same quarter, and an epidemical catarrh began to prevail among the people. Soon after an alteration was perceived in the type of the ordinary diseases of the place. This new form of the usual distempers manifested itself in coughing, hoarseness, pain in the breast, swellings of the throat and glands of the neck, with other symptoms of the true and spurious angina. In some there were swellings of the glands in the groins and near the ears, and fevers wore a malignant aspect.

Some of their prophets had foretold a sickly season, and

now they began to apprehend a mortal epidemic, similar to those which, at different times, had afflicted Genoa, Alexandria, Milan, Naples, Rome, and other places.

In this state of things they made a discovery which satisfied all their minds what the true cause of this sickness was. It was established to their satisfaction, that a Genoese tartan, under Neapolitan colours, had arrived at Messina, after a passage of thirty days, from Missolongh, in the mouth of the Gulf of Lepanto, opposite to Cephalaria. She brought wool, wheat, and some fine manufactures of the Levant. She had a clean bill of health, but had lost one of her crew on the voyage. The survivors were well. She had had no communication with any other vessel or port since she sailed. And the captain declared that the man had died of an ordinary disease, caused by fatigue on a disastrous and tempestuous voyage. She was admitted to quarantine; and while the wool was unloading, the captain, exposed to the sickly atmosphere on shore, fell sick with an erysipelas of his face, and died on the third day. Two days after, another man, who had been ashore, also became sick on his return to the tartan, and died with a swelling in the arm-pit, and petechiæ all over his body.

A consultation was held by the magistrates and physicians on the alarm occasioned by these accidents, and the tartan, and all her contents, except the men, ordered to be carried to a remote place and burned. All the other people continued well.

The full quarantine of forty days being performed, and *Te Deum* sung, an alarm was given that, in another part of the city, a disease prevailed, accompanied with buboes and other pestilential symptoms. The physicians sent to examine the sick, reported, that the distemper was nothing more than the epidemic which had prevailed since February. They grounded their opinion upon the fact that it was not contagious, and did not spread from person to person. Therefore it could not be *the plague*, whose essential character, they said, it was to be in the highest degree contagious. Physicians, surgeons, confessors and barbers escaped it, though they attended the sick in hospitals. And the like immunity had happened in the malignant sickness at Bronte and Modica some time before. The distemper, however, went on to increase with so much violence and mortality, that on the 4th of June it was allowed by all parties to be the *true plague*.

The story of its introduction by the before-mentioned tartan was not now deemed sufficient, in the judgment of the magis-

trates of Messina, to prove the introduction of the plague. They therefore apprehended two sailors, belonging to another vessel, a suspected pink. By threats of torture and the sight of the rack, a confession was extorted from them of the arrival at the port of Messina of the pink; after a coasting voyage to Modon, Patras, Missolongh, and other places. The contagion was brought on board in some rolls of tobacco or bags of biscuit; and after having destroyed several persons belonging to the pink, was landed among the unfortunate Messinians. Being completely satisfied with this *forced* story, which was modified by the engine of terror so as to answer every purpose they wished, they renounced the first one as erroneous and unnecessary.

The plague continued with but little abatement of its fury, notwithstanding the relics of St. Lucia and St. Bernard were sent to Messina from Syracuse to stop it, until the 2d of July, when the people took down from the great altar the ancient image of their tutelary saint, the Holy Mary, the mother of God, and carried it in procession through the streets. From that day the plague began to decline, after numerous other processions had failed, and other saints been applied to in vain.

As soon as the sickness was declared to be *the plague*, the inhabitants were panic-struck. There were no bakers to prepare bread. There were no labourers to dig graves. There were no nurses to attend the sick. And as the distemper was deemed contagious, every person was afraid to touch another, and even to approach him. The people of the surrounding country refused to bring fuel or provisions to market, and guarded the roads leading out of town with so much strictness as to prevent the flight of the unhappy citizens into the country. The putrefying carcases of the dead lay scattered through the houses, heaped up in the streets, and piled in larger collections at the church doors. These were so dangerous and shocking, that at length the furniture and wooden work of houses were carried into the streets for making fires to burn them. From these funeral piles fire was several times communicated to the neighbouring buildings. And by those direful consequences of the opinion entertained by the Franks, of the contagiousness and importation of *the plague*, the Messinians, instead of losing a few hundred persons, as they might have done by proper regulations, managed matters so badly as to destroy above forty thousand lives that season. The Turks judge more like rational creatures about this dis-

ease, and do not frighten, starve and poison themselves to death on account of it.

After the abatement of this calamity, so great a part of which was brought upon themselves by their own imprudence, they concluded that a general purification was necessary to restore to health their city, contaminated by contagion. To superintend this grand operation, the famous Dr. Polacco was sent for from Venice. And under his eye they went from house to house, and after various washings, ventilations, and other processes, concluded by fumigating with mixtures of pitch, brimstone, sal ammoniac, frankincense, storax, hartshorn shavings, raspings of pine, juniper-berries, dried rosemary, old leather, long pepper, camphor, gun-powder, orpiment, and antimony. And this ceremony being over, the surviving inhabitants returned to their homes, as fully convinced that the perfumery had destroyed the latent contagion, as that the image of the Virgin had stayed its active malignity.

Professor THOMAS FASANO judged better on this subject. He published a book at Naples on the epidemic fever which desolated that city in 1764. It is entitled, *Della Febbre Epidemica sofferta in Napoli l'Anno 1764. Libri iii. Di Tommaso Fasano.* He is so wholly convinced of local and domestic origin, that he does not even mention any thing about a ship. And this, in a sea-port, is a very remarkable circumstance. Fasano, with great good sense, lays it down as a principle, that *an epidemic is a slight plague, and that the plague is a powerful and furious epidemic*, (che l'epidemia fosse un leggiera peste, e la peste un' epidemia gagliarda e furiosa.) And in like manner, MICHAEL SARCONI, who wrote an history, in two volumes, of the distempers which prevailed at Naples in 1764, under the title of *Istoria Raggionata de' Mali osservati in Napoli nell' intero corso dell' Anno 1764*, does not pretend that this epidemic was any thing else than a pestilence consequent upon the extreme scarcity and famine of the preceding year.

ARTICLE II.

For the Medical Repository.

CASE of DISEASED BRAIN: *Communicated by Dr. JOSHUA E. WHITE, of Savannah, in the State of Georgia.*

ON the 21st of May last I was requested to see a mulatto boy, between seven and eight years old, who had been long sick, and of whose case I received the following history, as nearly as could be recollected by the mother.

In the summer of 1802 he had the measles in a favourable way, previous to which he had generally enjoyed good health. From this time he frequently complained of head-ach, would leave school in consequence of it, and had so constant a disposition to sleep, that it was with much difficulty he could be prevented from yielding to it, or he prevailed on to enter into the common amusements of children.

He was listless, inactive, and stupid. These symptoms continuing, in about two months he was attacked with convulsions at irregular periods. Almost every day he had one or more fits; and if sitting in a chair, would not fall, or, if near a wall, would support himself while it lasted, which was seldom more than two or three minutes. They generally terminated in sleep, for one, two, or three hours. The drowsiness continued to increase, and it was remarked to be always greater in the afternoon and evening. He would frequently cry without any apparent cause. His appetite, during this period, was irregular, sometimes voracious. About six months ago a swelling made its appearance about the junction of the right parietal with the occipital bone, which, gradually increasing, was, when I first saw him, about the size of two-thirds of a billiard ball. It was soft, yielding, and elastic, and there was evidently a loss of substance in this part of the cranium. A smaller one was afterwards observed immediately behind the right ear, which had been noticed to increase slowly, while the other as gradually decreased, so as to induce a belief of a communication between the two. He was now observed to squint, the pupil of the right eye became dilated, and he gradually felt the motion of the right arm and leg to be diminished.

During the progress of these symptoms his head was noticed to grow much faster than any other part of his body;

and a hat of the usual size for a boy of his age was much too small for him. It was, in fact, so remarkable, that among his play-mates he had the nick-name of big-head.

Upon my first visit, the most striking appearance which manifested itself was the unusual dimension of the head, particularly in a transverse direction. The pupil of the right eye constantly turned towards the nose, and was less sensible than the other to the rays of light. His skin was generally hot, pulse quick and somewhat tense, thirst considerable, and bowels very costive; appetite impaired, and he had a constant propensity to sleep. The right side was paralytic; the arm and leg of that side were much less than of the other; and he had almost constant convulsive twitches in the right hand.

From the duration of his disease, the emaciated state of his system, and the symptoms denoting an organic affection of the brain, I had no hopes of a recovery. He was blistered; calomel was given in small doses, so as to affect the salivary glands; and it likewise acted briskly on the bowels. The salivation was continued for a fortnight, without effecting any change in the principal symptoms of his disease. There was now a discharge of puriform matter from the right ear, which, the mother says, possessed the singular quality of proving instantly fatal to flies which accidentally lodged on it, insomuch that several have been found dead at one time within the concha and helix. He continued to have a return of convulsions almost every day, and in three weeks from the time of my first seeing him he expired.

Permission being obtained, an examination was made of the head on the morning after his decease, with the assistance of Dr. John Grimes.

From the upper part of one ear to the other, in a transverse direction, his head measured seventeen inches, and from the lower edge of the occipital to the same part of the frontal bone, sixteen inches.* After sawing through the cranium, we found a firm adhesion of the dura mater to almost the whole inside of it, but particularly to the left parietal bone. The two anterior lobes of the brain were in a healthy state, but the left middle lobe, and the right posterior one, presented

* A more correct idea may be formed of the preternatural size of the head, by comparing the dimensions of his with those of a twin sister. From ear to ear her head measured twelve inches, and from the upper part of the nose to the inferior edge of the occipital bone, fourteen inches. Thus it will be observed that, in the first way, his head measured most, whereas in her's it measured the least.

a remarkable appearance, totally different from the other contained parts. Perhaps no better idea can be formed of the change which had been produced by disease, than by comparing them to firm cream-coloured cheese. Between the cranium and the right posterior lobe was found some well-formed pus, and the skull was here thin and spongy. The ventricles contained about half a gill of dirty-coloured serum. In the other parts of the cerebrum, and in the cerebellum, no unusual appearances or marks of disease were discovered.

REMARKS.

The diseased appearance of the two lobes which I have mentioned, evidently denoted them to be in a state of schirrosis; and this idea will gain additional weight by attending to the first symptoms and the progress of the disease. That the extraordinary induration was the effect of previous inflammation, I have not a doubt; and I am still more confirmed in the belief, from the very firm adhesion which was observed to have taken place between the cranium and dura mater, which we know can only arise from inflammation, and which we also know does not exist in health, except at the sutures and the basis of the skull.

It would seem, from the long continuance of the symptoms, that the inflammation partook of that kind which Dr. Cullen calls chronic, which by Dr. Brown has been called asthenic, and which has been named phrenicula by Dr. Rush. The researches of the last-mentioned gentleman into the nature and causes of the internal dropsy of the brain, have been so far successful as to place the matter beyond a doubt, that this formidable disease is always the consequence of a primary inflammation in the brain, whatever may have been the direct or indirect causes of this inflammation.* The indirect cause of the congestion in the brain, in the above case, I believe to have been the measles.† As has been already noticed, he complained of his head from the period of his recovery from them; and perhaps the reason why water was not effused within the ventricles, and hydrocephalus formed, was owing to the less active nature of the inflammation than we know

* Hence we see the impropriety of naming a disease hydrocephalus where no water is found on dissection.

† Several authors have mentioned instances of hydrocephalus consequent to eruptive diseases; and Dr. Rush says he has seen a case in which it was evidently the consequence of the measles.

to be necessary for the effusion of water. A similar fact is often witnessed in other glandular parts of the body, particularly the liver and spleen; and is it not probable that the swelling of the joints in chronic rheumatism is the effect of a like action in the arteries of the part? It has also been remarked, that some pus was found between the cranium and the right posterior lobe; and for the formation of this, it is a fact well established, from the knowledge which we possess of the actions and powers of an animated body, that a certain degree of inflammation is indispensably requisite.

If the morbid appearances of the brain, on dissection, in the case just related, tend to elucidate the primary cause, and if the deductions I have drawn be admitted as correct, we shall have advanced a step further in our knowledge of that disease which has been generally known by the name of the internal dropsy of the brain, but which has been more properly called, by Dr. Rush, "chronic apoplexy." They will also aid in establishing the theory, as suggested by that gentleman and Dr. Quin; and, by attending to it, will consequently lead to a more successful practice than unfortunately has hitherto been exhibited in that formidable malady.

ARTICLE III.

Some REMARKS on the ORIGIN and PROGRESS of the MALIGNANT YELLOW FEVER, as it appeared in the Village of Catskill, State of New-York, during the Summer and Autumn of 1803: In a Letter from Dr. BENJAMIN W. DWIGHT to ENEAS MONSON, M. D. of New-Haven, Connecticut.

[Continued from page 121, and concluded.]

HAVING stated, as I trust, a sufficient number of cases to evince the nature of the epidemic at its commencement, I shall now proceed to mention the ordinary symptoms which occurred in patients generally, and the extraordinary symptoms which occurred in particular cases.

Previous to the onset of the disease, patients generally complained of slight indisposition, such as is usual before the attack of fever. This was quickly succeeded, in most instances, but not in all, by a chilly fit. In a short time violent pain came on in the fore-part of the head, in the eyes, loins, and

hips, in many instances extending down the thighs to the knees. In some instances the pain was most severe about the knees, and in that part of the leg where the gastrocnemius and soleus muscles unite to form the tendo Achillis. The face was much flushed: the eyes, in some instances, were of a fiery red, in others of a dull red appearance, and very intolerant of light. There was a stinging or burning heat in the skin: the pulse was full, quick, and hard: the tongue covered with a whitish fur, and moist: the thirst, in some instances, was excessive, in others moderate: the stomach was distended and very irritable. The sick complained much of a burning heat, pain, and excessive sickness at the stomach. They were troubled with frequent retching, and occasionally with vomiting; but they seldom brought up any thing, in this stage of the disease, except mucus and their drinks, and a small quantity of a greenish and very acrid matter, which, at times, almost corroded the fauces. A great quantity of gas was eructated.* The bowels were generally costive. Great restlessness and despondence, and frequent moaning, and tossing about the bed, to find, if possible, some relief from change of posture, were common symptoms. Several patients who had formerly been affected with intermitting and remitting fevers, declared that the pain which they suffered from this disease was more severe than all that they had endured in their lives before. Upon going into a patient's room, the common salutation was, "I shall die, I cannot get well again." After a short period had elapsed, the stomach was the part most affected.

When stools were procured by injections or cathartics, they were usually thin, and not to any considerable degree bilious. Except the colouring which they acquired from calomel, they were whitish.

No distinct remissions or exacerbations occurred in any instance,† but the disease marched steadily on till it was arrested by medicine, or till it had finished its course.

* The quantity of gas discharged from the stomach and bowels was, in some instances, so great as to induce a belief that it was owing either to a decomposition of the gastric liquor, or that it was a morbid secretion from the areolæ which secrete that liquor.

† The difference in this respect between yellow fever and the common bilious remitting fever, as it appeared in the neighbourhood, was very remarkable, and, as it seemed to me, the most characteristic symptom by which to distinguish the two diseases. We had several severe cases of bilious remitting fever within a few miles of the village, and in every instance there were distinct alternate remissions and exacerbations, so that the most inattentive bystanders noticed it.

The first stage of the disease generally lasted from one to three days. In a few instances, perhaps, it extended into the fourth day. About this time a yellowness of the eyes came on in many, but not in all instances. The pain was much lessened. The pulse became frequent, but not hard, nor very full. The skin was dry, but much less hot. If the patient became evidently better at the first stage, the recovery was, in some instances, very rapid; but if the disease was undermining the constitution, the uneasiness at the stomach and the restlessness increased, and stupor rapidly crept on. Silly delirium was a frequent symptom in this stage of the disease. The yellowness became more and more manifest, and diffused over the face, and, in some instances, over the body. Suppression of urine, black-vomit, coma, convulsions, and coldness of the extremities, followed in rapid succession, and death soon closed the miserable scene.

These were the more ordinary appearances which the disease assumed. In one patient, a young lady, during the first stage of the disease, the hands and arms were nearly covered with large crimson-coloured blotches, many of which were round, and of the size of a half-dime; others were of the size and figure of a damascene.

During the second stage, hæmorrhages, in several instances, took place from the nose, mouth, and uterus. W. Hammond, a day-labourer, a man of a robust habit, had the disease severely. The symptoms were very unfavourable till they were cut short by a salivation. About three days after the soreness of the mouth came on, the gums became exceedingly spongy, and he discharged from his mouth, in the course of 48 hours, more than six pounds of florid blood. After this the hæmorrhage ceased, and he recovered in a manner surprisingly rapid.

Hæmorrhages from the mouth, nose, anus, &c. were unusually frequent this year, in the common bilious remitting fever.

One patient, an Irishman, of a very vigorous habit, was, on the third day of his disease, in fine spirits, chatted, and enjoyed himself to a very unusual degree. He complained of no pain: his countenance was clear: his pulse nearly natural. About twelve o'clock he sat up in the bed and shaved himself. In the evening he was affected with continual hiccough. During the night he was affected with black-vomit to a great degree. Early the next morning he got up to the window, and hollowed to some persons, who were about ten rods distant, to bring him some meat and drink, and said he was very

hungry. He lay down again, and complained of vast uneasiness at the stomach; and, after making one struggle, instantly expired.

Another patient was in the same cheerful mood, and, within two hours, was overpowered with stupor to so great a degree that it was very difficult to arouse him. He died not long after, with black-vomit and convulsions. The cheerfulness in these two cases resembled that which is produced by drinking freely of wine or brandy. The first of these patients, as there was strong reason to suspect, had indulged himself in that way.

The last of these patients, and one other, had, during the last stage, frequent stools, resembling strong beef-brine, and highly foetid.

One patient, Lavinia Parsons, who resided in the same house and room with Briggs several days, during the early part of his illness, becoming unwell, alarmed at her situation, removed to Mr. Ferguson's, a distant and very healthy part of the village. Continuing unwell, though not confined to her bed, she was, a few days after, taken in a carriage to Freehold, about twenty miles westward of Catskill. At Freehold she soon became more seriously sick, and was brought back to Ferguson's. Her disease was considered by Dr. Croswell as a very decided case of *typhus gravior*. The fever lasted four or five weeks without any intermission. I saw her a few times during her sickness, and had the same opinion of its nature. Just before her death, being near at hand, I was sent for in great haste, and found her vomiting matter which very strongly resembled chocolate-grounds.

A little girl, Lavinia Parsons's sister, who came from Connecticut in the month of August, went to Briggs's house, and staid there one night. This was soon after he was taken sick. The next morning she went to Ferguson's. About the same time that Lavinia was seized she began to complain. Her's was a very clearly marked case of *typhus gravior*. A few days after Lavinia died she began to recover. From these facts may we not infer that the jail and yellow fever are species of the same genus? and that the miasmata producing yellow fever are not specific, but may, according to circumstances, produce jail, or yellow, or some other fever?

I will only add, that no other persons were affected with fever in this neighbourhood.

TREATMENT.

Dr. Croswell and myself practised together considerably, and our mode of practice was similar. If called at the onset of the disease, after a little experience had taught us what type it had assumed, we made very liberal evacuations from the bowels. This was effected by calomel alone, or conjoined with jalap. Ten or twelve grains of each were usually given to an adult patient. This was frequently aided or preceded by stimulating injections. In some instances blood-letting was indispensable. To allay the excessive sickness and burning at the stomach, we tried, in several instances, the effervescing draught, but it was of no kind of service. Neither did the aq. ammon. acet. appear to alleviate those troublesome symptoms. Alkalies alone were of any real benefit, and a very liberal use of them was adopted. After the cathartic had ceased operating, calomel was administered in small and frequent doses, with or without opium, according to circumstances. Mercurial ointment was also, in a number of instances, applied freely, so as, if possible, to ensure a salivation. While this plan was in operation, the bowels were kept free, by injections or otherwise. In a few instances we attempted to cure the disease by copious and long-continued sweating, but our success was not such as to warrant this mode of practice. It was with the utmost difficulty that sweating could be excited and kept up for any considerable length of time.

The drinks were toast-water, barley-water, rice-water, chicken-water, and good spruce beer; the last of which, in several instances, sat better upon the stomach than any thing else.

Particular pains were taken to keep the rooms of the sick well ventilated. Their linen was changed often: vinegar was sprinkled upon their floors, and its steam diffused about the room.

If the disease proceeded on to the second stage, and the irritability of the stomach increased, a large epispastic was applied to the abdomen, and sinapisms to the feet. If to these were added delirium, or comatose symptoms, epispastics to the neck, thighs, legs, and arms, were also used.

When patients *began* to convalesce, good old Madeira wine, and porter, were very serviceable. After a little period had elapsed, colombo and bark were used advantageously.

But wine and porter were evidently preferable in the beginning. The elixir vitriol also was often useful.

Some persons were slow in recovering. Those whose systems became so far affected with mercury as to produce a soreness of the gums, all recovered, and generally in a very rapid manner.

No other fever occurred, during the prevalence of this disease, within the circle of its ravages.

The number of deaths, including Lavinia Parsons, was eight.

About forty persons were affected with the disease; perhaps I should say, more properly, that there were about thirty clearly marked cases of the disease, and as many as ten or twelve doubtful cases. The latter we considered, at the onset, as decided cases; for in most, or all such instances, the complaint commenced with striking symptoms of this disease, and generally threatened a violent attack. But the patients, instead of delaying twelve or eighteen hours, to ascertain whether they were about to be severely sick or not, applied immediately for medical aid. In such instances very free evacuations were procured from the bowels; after which sweating was, in several instances, excited, and kept up for a considerable length of time. Thus the symptoms were relieved, and by the second or third day the patient was evidently on the recovery. Were I to express an opinion, I should say that these were undoubted cases of yellow fever, and that the disease was completely subdued in the first stage.

Of those who died, one person, who was upwards of fifty years of age, possessed a constitution much shattered with syphilis and hard drinking, and would not, probably, have survived an attack of any inflammatory fever: a second died from a relapse: a third, as there was strong reason to believe, from drinking rum when he was apparently out of danger: a fourth, Mrs. —, who had reached the tenth day of the disease, and bid fair to recover, was seized with premature labour, and expired shortly after: two others had greatly fatigued themselves immediately previous to the onset of the disease: a seventh, who was seized very violently, did not apply for medical aid till the inflammatory symptoms had nearly subsided. The eighth was Lavinia Parsons.

When these things are taken into consideration, the disease, to say the least, was not more fatal here than it has heretofore been in New-York, New-Haven, Philadelphia, and various other towns.

Of those who were affected with the disease, one-third

were attacked in August, and two-thirds in September. The last person that was attacked was seized September 28. Three died in August, and five in September. Females generally were handled much less severely than males. Six of those who died were males.

None of our patients, during or after convalescence, were, to any considerable degree, affected with œdematous swellings.

A number of patients, after convalescence, lost most or all of the hair from their heads.

I come next to make some observations with respect to the origin of the disease. In a former part of this letter, I remarked that the creek, about three-fourths of a mile from its mouth, took a turn to the west, and that, along this bend, a street was laid, running nearly at right angles with the main street. Around this corner, and south and west of it, a number of houses and stores are situated, nearly or directly upon the bank. To these houses, and a few others on the opposite sides of the streets, the disease was confined.

At the bottom of the bank is a narrow strip of made-ground, on which are situated two or three stores. In one of these stores, during the month of May, between two and three hundred barrels of herrings were deposited. The brine, which is composed of the blood and oil of the fish, impregnated with salt, ran out, during the hot weather in July, in large quantities, upon the floor. To conduct it off, a scuttle had been cut in the floor, and the floor was made descending from all quarters to this place. Of course the brine settled upon the ground below, where it became highly putrid and offensive. The store has no cellar, and on one side no underpinning, so that any noxious effluvia which might be generated here would have abundant opportunity to escape and poison the surrounding atmosphere. From the nature and arrangement of the ground and buildings around (the bank forming nearly a semicircle, and being from ten to fifteen, and in some places twenty feet higher than the ground on which the store stands, and being, in a great measure, covered with buildings), it may be easily conceived, that those who lived in this neighbourhood must have daily and constantly inhaled a poison highly concentrated. Any effluvia existing in this place, unless possessing a specific gravity less than the atmospheric air, could not, without difficulty, escape far. The stench from this place was intolerable, as I often perceived, at the distance of several rods. To those who lived in its near neighbourhood it was less so, but by others it was much complained of. Some

mechanics, who were employed from time to time in working in and about the store, complained of being much nauseated by the stench.*

Mr. H.'s house, that in which the disease commenced, is situated directly on the bank, about sixteen yards north of the store. The north end of the house stands on the top of the bank, the south end at the bottom. The family lived at the south end, on the lower floor, and nearly twenty feet lower than the surface of the street. Whenever the wind blew from the south it came directly from the shore upon them. The air here was also oftentimes damp, chilly, and confined. It may not be useless to observe, further, that the room in which Mr. and Mrs. H. slept was situated under an open piazza, and that, after every rain during the latter part of July and the early part of August, it became damp, and oftentimes wet, so that the clothes hanging in the room were much moulded. Mr. H. had, for several weeks previous to his sickness, been accustomed to open the store early in the morning, before breakfast, and to hoist the windows.

The three first persons who were affected with the disease lived in his house, and composed the whole of his family at this time. The two first were seized on the 10th of August—the third on the 11th—Briggs, the fourth, about the same time. He lived in a house situated on the bank, about ten yards distant. The fifth spent his days and nights principally in Mr. Croswell's printing-office, which stands about four rods north of Mr. H.'s house. He was also not unfrequently in the near neighbourhood of the store. I cannot find the least shadow of a reason to suspect that either of the four first had been in any way exposed to *contagion*. The fifth patient, who was seized August 19th, was present at the interment of Mr. H. and hence, some persons might conclude, took the disease from *contagion*; but let it be remembered that he was constantly encircled by an atmosphere highly *infectious*. The sixth, John M——, left New-York August 10, and arrived here the 11th, in the evening, about twelve hours after Briggs was taken sick. This man came up in the *Commodore*, a sloop plying between this and New-York. On her arrival

* October 16, I went, in company with several gentlemen, to the wharf on which this store stands. The sickness had entirely ceased, and all apprehensions of it had died away; but the stench was so unpleasant, notwithstanding the herrings had all been removed in August, and a considerable quantity of unslacked lime had been thrown in and under the store, that we retired in haste, without having staid our intended time.

she was immediately hauled up along side Day's wharf, which is adjoining that on which Hale's store stands. On board of the Commodore John spent his nights, and around Hale's store he was employed during the day. Whether he took the disease here or in New-York is not *certain*, nor very material. From several circumstances we are inclined to think he took it here. That he should have communicated it to any one is very improbable, as he died very soon, and as no one who visited him had the disease. The next cases occurred in such houses as were situated nearest to the store.

To trace the progress of the disease minutely any further would be tedious and unnecessary. I shall only add, that it was confined to the near neighbourhood of this store; that every person who experienced an attack of it, except two or three, resided within a stone's throw of the store; that these were employed, for a number of days, about their usual business, within two or three rods of the same place; and that none of the numerous visitors and watchers from other parts of the town were affected with the disease. Probably more than fifty persons visited Mr. and Mrs. H. during the first six days of their illness. They, and many others afterwards, visited and watched with the sick. Old and young, males, and not a small number of delicate females, performed for them these and other kind offices. Of course many persons, and some of them possessing habits in no small degree liable to be acted upon by noxious effluvia, were much exposed to contagion, if any existed; but none felt any ill effects from it. In no instance was there any good reason, in our opinion, to believe that the disease was communicated from one person to another.

That the cause which I have assigned will, by all persons, be deemed a satisfactory one, I have not the vanity to imagine. That it appeared so to us we have no hesitation in declaring. In confirmation of this opinion, the following fact may be mentioned. Saturday, August 13, Dr. Croswell and myself being desirous to explore the cause of the disease, examined the state of the store, and the ground beneath. Having spent some time in accomplishing this object, we stepped a few feet aside, and continued conversing together for near half an hour. Though we were to the windward of the store, and the wind blew fresh, I perceived, several times, the stench to be very unpleasant. During the remainder of the day I was affected with slight head-ach and some degree of nausea. The next morning I rode out four miles to visit a patient.

In addition to the ill feelings of the preceding day, I soon began to be affected with a severe burning in the fauces and stomach, and a distressing pain in the fore-part of the head. These disagreeable feelings rapidly increased till I returned. In a short time after, a profuse evacuation from the bowels took place, and I became almost immediately relieved. For eight or ten days after this, my perspiration was of a very peculiar and offensive smell. The burning in the throat and stomach produced a sensation altogether different from severe heartburn.

If the cause which I have assigned was not the true one, I may safely say that it remains yet to be discovered. No other cause, which is capable of a moment's defence, has yet been suggested, at least within my knowledge. Most of the inhabitants acceded to the opinion of its being produced by the herring-brine. All acknowledged this to be *causa sine qua non*. Some persons, however, it is but just to mention, attributed it to another and very different cause. Early in the morning of the 9th of August, Mr. H. and family, and various other persons, were called upon to see a negro woman who lived in the neighbourhood, and who was supposed by the family to be expiring. This woman had been sick for several weeks; and some persons, rather than admit the yellow fever to originate from so *inefficacious* a cause as putrid fish or brine, concluded that it must have been communicated from Mary, the negress above-mentioned. How, or where she acquired the disease, no one could tell, till fruitful conjecture at length unravelled the mystery:—A person possessing a very luxuriant imagination, and terrified at the name of yellow fever, some time about the middle of August, passed near the negro house, and observed a basket of clothes standing at a little distance from the door. He “thought they appeared dirty,” and smelt unpleasantly, and cautioned all those within hearing not to come too near, for, to use his own expression, he “guessed that the clothes did not contain any thing good, and that there was no advantage in standing too near them.” After guessing a little more, some uneasiness was excited in the minds of the bystanders. This hint, so gratifying to popular prejudice, was industriously circulated, and gained colouring and strength from every mouth that delights in telling some new thing; and it was soon currently reported, that Harry, Mary's husband, who was employed as a sailor on board the sloop *Commodore*, had purchased a chest of clothes in New-York, at auction; that these clothes had, in all pro-

bability, belonged to some person who had died of the yellow fever; and that in this way the disease was undoubtedly communicated to his wife, and from her to others. This was declared by Harry, in the most solemn manner, to be wholly without foundation. His wife, and mother (who is a very sober woman), declared that he had not brought home any articles of clothing, at any time during the present season, except such as he usually carried with him. Capt. Post, master of the Commodore, whose character for veracity and uprightness, and vigilant attention to his business, needs no commendation, also assured me repeatedly, that Harry had not, at any time during the present season, brought up any articles of clothing, except such as he usually carried with him, nor any boxes, nor trunks, nor chests, nor baskets, nor any thing else of the like kind. All this did not satisfy such as were unwilling to be satisfied. But after a few days had elapsed, the subject was cleared up to our entire satisfaction.

On Friday, the 12th of August, when the Commodore, which had arrived from New York the evening before, was unlading her cargo, a basket of clothes, belonging to a negro passenger, was brought to Harry's house, and placed at a little distance from the door. While standing here the man above-mentioned espied it. This was that baleful fountain whence issued such exhalations as filled all the surrounding atmosphere with poison and death. Let it be remembered that the vessel which brought this basket of clothes did not arrive here till August 11th, about twelve hours after Briggs (the fourth case) was taken sick, and not till near a month after Mary was seized with her complaint. In what manner this basket of clothes introduced the yellow fever, it requires more ingenuity than I possess to determine. In addition to all this, Mary, the negro woman, had not the yellow fever, neither has she had it, at any time during the present season. About the middle of July she was attacked with common bilious remitting fever; a fever which *was* wholly different, in its beginning and progress, from the yellow fever. It came on very slowly, she gradually becoming sick for near a week before she was confined to her bed, and it was marked daily with distinct alternate remissions and exacerbations. This cannot be said of the yellow fever, *as it appeared here*, in any instance. At the time Mr. H. and family, and others, were called upon to witness her apprehended departure, she had a violent hysteric fit, a complaint to which she was much subject. She had at this time been convalescing for more than

a week. The idea that any person should have caught the yellow fever from her in this situation is truly laughable, especially when we consider that none of her numerous watchers, so far as can be ascertained, had the disease.

This long, and, I fear, tedious statement, might have been omitted, had I not deemed it advisable to strip the subject bare of that false and darkening veil which has been cast over it.

No other mode of accounting for the existence of the disease has yet been suggested, within my knowledge. Mrs. H. who is a very domestic lady, had been but a few rods from the house for several weeks. Mr. H. Emma, and Briggs, had not, so far as can be ascertained, been in any way exposed to contagion. The irresistible conclusion is, that the disease originated here; and where, let me ask, is the improbability of such an event? Does not the climate of the United States, aided by filth and other local causes, in some part or other of it, give birth to diseases, every year, of as malignant a nature as the yellow fever? A very malignant dysentery, you well know, has appeared this season in New-Haven and Stratford, and many other parts of New-England, which has been more fatal than the yellow fever of Catskill. The last year, the towns of Northampton, Greenfield, and Blanford, in Massachusetts, suffered very severely from a most malignant epidemic; yet no person supposes that the disease, in any of these towns, was imported from a foreign country. Nearly one twenty-third part of all the inhabitants, as I was informed by Dr. Hunt, died in Northampton, in the year 1802; a town usually uncommonly healthy.

Were physicians, in all parts of our country, careful to write accurate histories of the epidemics which fall under their observation, I cannot but think that the doubts on the domestic origin of the yellow fever would be in a great measure removed.

The foregoing observations I have detailed to you with that freedom which ought to be exercised in discussing any interesting subject; confident that, if I am in an error, you will exercise towards me all that candour and friendship which I have heretofore experienced from your hands; and that if, on the contrary, I have laboured in supporting a just cause, you will not be the less ready to admit the weight of facts, though they oppose the opinions which you have espoused.

ARTICLE IV.

PRACTICAL and DIAGNOSTIC OBSERVATIONS on YELLOW FEVER, as it occurs in Martinique, and on the Remedial Effects of Calomel and Opium in the same; together with some Remarks on the Glandular Disease of Barbadoes. By Dr. GEORGE DAVIDSON, late of St. Vincents, in a Communication to the Editors, dated Barbadoes, January 27, 1801.

I ATTENDED at Fort-Royal (Martinique) three ships, which brought a loading of Teneriffe wine for the use of the navy; which, independent of all theory or reasoning on the subject, I have ever found the sickliest of ships. Those three vessels were anchored under the walls of Fort-Edward, to the leeward, and where there was no back draught of air, exposed to the exhalations of a swamp, which, although at the distance of six or seven hundred yards, had not a sufficient space of salt water to pass over to be rendered innocuous. There was some doubt whether the fever on board those wine ships owed its origin entirely to miasmata, or whether contagion had not a principal share. The Army brig, with a very malignant fever on board, had anchored close to the Grenville, Capt. Cummings, the outermost ship of the three anchored in a tier; but although she was the most sickly of the three ships, she was still to windward, and I know of no direct nor indirect communication kept up with the Army brig. A young man belonging to the Traveller, Capt. Davis, one of the three ships alluded to, was the first seized, and evidently brought on the disease by having spent the day on board the Army brig, with a companion of his, and being attacked with the usual symptoms of yellow fever that night, died upon the fourth day. I did not see him until the third day. The master exhibited an emetic, which, as usual, had produced violent effects, incessant vomiting, hiccough, &c. which terminated in black-vomit. Capt. Cummings, of the Grenville, was amongst the first who complained on board that ship; but having taken jalap and calomel, kept his body open, and his gums constantly sore, he escaped a severer attack of the disease. One of his crew, who was the first attacked with the most violent symptoms of the disease, by following up the mercurial course, was in a few days in safety; but resuming

too soon his usual avocations, and exposed to the ardent heat of the sun, he relapsed, and died within forty-eight hours of the last attack. And this was the only fatal case belonging to that vessel. Nine more belonging to her were landed the same night, attacked in the most violent manner. Vomiting came on early, with hiccough. Several were delirious, with suppression of urine, and excruciating pain of the head and loins. My practice was to shave the head at the commencement, to dash the body with pails of cold water, to put them to bed, and give some warm acidulated drink, so as to produce sweat; if costive, to give a purgative glyster, or jalap and calomel; if any return of the feverish heat, to repeat the cold ablution or dashing of water, and continued this practice until the inflammatory or first stage was over. I then had recourse to calomel conjoined with opium; from one to two grains of opium, with from two to five grains of calomel, every two hours, or at longer intervals; which practice was continued, varying the doses of the two medicines according to existing circumstances, until such times as symptoms of mercurial action commenced, and then diminishing the dose. When salivation commenced I considered the patient out of danger. It was seldom that the patient craved any thing but the most cooling ascescent drinks, such as the sourest beverage, sometimes brisk small beer, or porter, but seldom or never wine, until the convalescent stage, when he was indulged in that, and nourishing soups. I preferred a watery or vinous infusion of the quassia amara to the bark: it sat easier on the stomach.

Treatment of the particular and urgent Symptom of Vomiting.

A peculiar and distressing oppression about the præcordia was a pathognomonic symptom of the disease. Vomiting was more easily prevented than removed, by the early application of a blister to the pit of the stomach, and by keeping the body open by cooling laxative glysters. When vomiting did occur, magnesia in mint-water was given, saline effervescent draughts, the vitriolic æther in a glass of water slowly swallowed, theriaca applied to the pit of the stomach, capsicum in doses of three or four grains, brandy and water, and mulled wine; but my principal dependence was upon injections of a solution of assafoetida ʒ iij. to ʒ vi. water, and the tincture of opium two or three hundred drops, which seldom or never failed in checking the vomiting, however severe. The tincture of opium, or solid opium afterwards exhibited by the

mouth, prevented a return of this disagreeable, and too often fatal symptom; but I have also to observe, that this remedy seldom answered during the first stage of the disease, and, perhaps, was not the appropriated remedy.

The history of a case which terminated fatally will, perhaps, illustrate what I mean to inculcate more forcibly.

The mate of the ship *Britannia*, Capt. Smith, had been attacked last October with yellow fever at Fort-Royal, and had employed a French practitioner, Dr. Derst, to attend him. I found, upon inquiry, that he had been largely bled at the commencement, and afterwards put upon a cooling ptisan, composed of cassia fistularis, sour orange-juice, endive and purslain. Upon the third day, notwithstanding a great irritability of stomach, which would retain nothing, the bark had been thrown in, but without either allowing the patient wine, or any nourishment. Upon the fourth day the vomiting had become black, attended with hiccough. Upon the morning of the sixth day, at four o'clock A. M. a violent hæmorrhage at the nose had come on, which lasted till two o'clock P. M. without any thing being done but the feeble application of cloths dipped in vinegar and water. He had now lost several pints of blood: his pulse could scarcely be felt at the wrist: his extremities were cold: and I did not expect that he would live six hours. I immediately gave him five grains of opium, and went home to prepare a plug for the nostril of sponge and waxed thread; but upon my return I was astonished to find that the hæmorrhage had not only stopped, but that the vomiting and hiccough had also disappeared. I ordered five grains of opium, to be repeated every hour. Towards evening he had enjoyed some refreshing sleep: his pulse had got up: his extremities became warmer: and I had some hopes of his recovery: having ordered a continuance of the same plan, with wine and nourishment. But I apprehend that this plan had not been rigorously followed up during the night. I found him next morning much worse. His pulse had again sunk, with subsultus tendinum, and cold extremities. The patient was, however, sensible to the last moment, expressing his unavailing wish that I had seen him earlier.

*History of a Case which terminated successfully: Mr.
FRANKLIN, about 15 or 16 Years of Age.*

He was attacked with considerable horror and rigor, without tremor, about midnight. I saw him the next morning, and

found him complaining of violent head-ach and pain of the loins; his eyes much suffused; pulse 120, but not full. From the manner of attack, and duration of rigor at the commencement, which is always a symptom of violent disease, I had reason to dread the event. After purging him with jalap and calomel, I began with the opium and calomel, which had answered so well in the former cases. I gave him about a grain of opium and three of calomel, which was repeated every two hours, and which I administered myself, watching its effects. His feet and legs, to the knees, were bathed in tepid water, whilst the head and shoulders were suddenly and unexpectedly dashed with cold water. He was then put to bed, after being well dried, and an attempt to produce a determination to the surface, by giving diluents. The symptoms, however, still continued, without any alteration, till the third day. He had no inclination to sleep. The opium and calomel had sat easy on his stomach. The heat of the surface, however, still continued undiminished, notwithstanding the repetition of cold ablution. Gr. ss. of merc. calcinat. with gr. iss. opium, was administered, therefore, on the third day, which I still gave myself, and repeated every two or three hours; which also sat easy on the stomach. On the fourth there was slight moisture perceived upon the skin, which soon became more diffused. The pulse became softer, the edges of the tongue moist: had a few hours of sound sleep, which much refreshed him. An abscess appeared to be forming behind the left ear, attended with considerable swelling and enlargement of the submaxillary and parotid glands. After poulticing several days, the swelling appeared to be discussed; but upon examining the inside of the cheek, a large gangrenous carbuncle was discovered, about the size of a shilling, which had also spread towards the tongue. I was obliged to detach, with a pair of crooked polypus scissors, a considerable portion of the left buccinator-muscle, to wash the mouth with tincture of myrrh, and give decoction of bark and tincture of opium. His recovery was rapid; and in the course of three weeks, or about the 21st day, he was able to quit his chamber. He had, during the course of the disease, a strong craving desire for the sourest beverage and ascendent drinks, and brisk small beer and porter; but it was not until he was advanced in the convalescent state that he could be prevailed on to taste wine.

This young man was of a thin, delicate habit of body, and had, when a child, received a very material injury from a fall, which had fractured one of the ribs of the right side, and obliged him constantly to wear a bandage.

Having mentioned to Dr. Robertson, of the Naval Hospital at Barbadoes, my treatment of yellow fever, and shown him the detail now recited, he, with that liberality which distinguishes the man of science, told me that he would make a trial of this plan in the first cases which occurred. Fortunately, whilst I was at Barbadoes last January, two sailors were brought to the Naval Hospital with the usual symptoms of yellow fever. They had been both two days ill; complained of violent head-ach, pain of the loins, and high fever. One had a vomiting and purging, the other vomiting alone. Dr. Robertson gave each of them gr. i. opium and gr. ij. calomel, every second or third hour. They were both considerably better the next day. The opium and calomel were therefore given at greater intervals; and on the third morning from their admission (the fourth of the disease) both complained of the mercurial action, and were soon out of all danger.

DIAGNOSIS.

As the treatment of yellow fever, and *causus*, or ardent fever, is essentially different, an accurate discrimination of the two diseases is of the utmost importance.

The acute *causus* may occur at any season of the year when the weather is dry and the heat great, but more particularly occurs in the month of November, and from thence till March or May, if the weather is still dry; when Europeans, or people from cold latitudes, lately arrived, are exposed to great fatigue under an ardent sun, especially where they have been intemperate in the abuse of spirituous liquors, and exposed to night air, dews and damps, without suspicion of being exposed to marshy miasmata.

The attack commences with high symptoms of excitement of the vascular system, and great determination to the brain; flushed face; inflamed eyes; tongue dry and parched; urine frequently limpid, at other times scanty and high-coloured; the head-ach is more acute, as if both temples were transfixed by some sharp instrument; delirium sooner comes on; a hæmorrhage from the nose, eyes, sometimes ears, &c. occurs more frequently; more anxiety about the præcordia; vomiting, which frequently ends in black-vomiting upon the second day; the pulse hard, full and high, nor is the artery easily compressible at the wrist; a yellowness early commences at the angle of the jaw, extending over the neck, face, and breast. The symptoms are relieved by blood-letting, and the pulse rises.

Blood-letting is here the principal remedy to be depended on. If that evacuation is neglected, the progress of the disease is very rapid. The success attending the use of the lancet in this disease has led too incautiously to its adoption in yellow fever, where the most fatal effects have followed from employing it.

Yellow fever, strictly so called, is the product of heat and moisture, marshy miasmata, and septic exhalations, and prevails chiefly during the autumnal months, not only when the heat is greatest, and the rainy season commencing, but also on account of the prevalence of winds from the sea, which arrest the marshy exhalations, and prevent their being carried clear from the land. The attack is not so strongly marked with those high symptoms of vascular excitement. The head-ach rather resembles that dull heavy pain which follows a night of debauch: the face seldom flushed, but has more an appearance of savageness, ghastliness, and despondency: the eyes dull, heavy, and of a brownish tinge: the pulse, although having sometimes the feeling of fulness and strength at the wrist, yet the artery is easily compressible, and the pulse does not rise upon blood-letting: the belly is generally open, frequently with clay-coloured stools. Remissions are here also seldom met with within the first forty-eight hours, but more frequently than in the *causus*.

I consider this form of fever as a disease of exhaustion, and to be treated entirely upon the tonic and stimulating plan; to bring on a new action sufficient to overcome the febrile one, and effectually destroy the morbid catenation, as Darwin would express himself. With this view I have employed cold bathing at the commencement as a remedy principally adapted to the first stage of the disease, occasionally repeated, and joined to purgatives. As a powerful tonic, I have used opium; but as the effects are not permanent, I have joined to it an active mercurial preparation, whose effects being more lasting, give some criterion of its action by the affection of the salivary glands; which also assists in determining to the skin, and resolves the constriction of the surface—excites a copious flow of urine, and prevents that costiveness which opium alone would produce. Besides, as most febrile diseases in hot climates are attended with congestion or local affection of the liver and abdominal viscera, mercury is peculiarly adapted to prevent or remove those visceral obstructions. Perhaps the combination of two active medicines may, like chemical union,

produce effects which neither singly possessed: opium expending the irritable principle, and the mercury furnishing oxygen and irritability.

Extract of a Letter from Dr. ROBERTSON.

" Barbadoes, March 19, 1801.

" I have had several cases of fever, with exasperated symptoms, and much yellowness of skin, since you were here; but by the exhibition of opium, calomel, and the use of the cold affusion or ablution, at the accession, or when the skin was dry and parched, I have been very successful, not having lost a single case.

" The opium is unquestionably of the greatest utility when the powers of life are low, and the strength of the patient exhausted; and will rouse the patient from stupor, coma, and low delirium, when other means are ineffectual; but it does not appear to be so expedient when there is much increased action on the surface. Calomel and cold affusion are more suitable remedies, and may be used at the same time without any inconvenience: and, indeed, there is no impropriety, but the contrary, in exhibiting an opiate after the cold affusion. The effect is wonderful and efficacious; for when the accession of fever is moderated by the cold affusion, and the irritative motions abated, if not reduced below the mean of healthy action, by the dash of cold water, the opiate, by its stimulating and diaphoretic effect, restores the equilibrium, and effectually disturbs the morbid catenation; and so both remedies tend jointly to produce the salutary effect.

" JAMES ROBERTSON."

A singular case of general aphthæ was communicated to Dr. Robertson by an eminent apothecary of Barbadoes. The aphthæ first attacked the patient's mouth and fauces, composed of a number of small phlyctænæ, which, in the progress, had spread *ab ore usque ad anum*, attended with most disagreeable sensations, as if he had scalded his mouth with boiling water. In the progress he was attacked with constant vomiting and purging, with burning and excoriation about the verge of the anus, a total loss of appetite, and gradual marasmus. He had tried every thing without success. His apothecary advised, at last, vegetable acid, diluted, for common drink—rice, sago, and light diet—which soon restored him to perfect health.

The excessive heat of the climate, and the dryness of the air of that island—breathing an air surcharged with muriate of

soda—and possibly the abuse of spirituous liquors—had occasioned, probably, torpor of the absorbent vessels, succeeding their increased action, and a state of exhaustion of the lymphatic system. Hence the benefit which he derived from the citric acid restoring the lost tone to the vessels.

The pathology of that disease in Barbadoes, so well described by my late worthy and respected friend Dr. Hendy, may possibly be explained upon the same footing.

The island of Barbadoes has no elevated mountains, is entirely cleared, having no woods to attract rain. It is, in consequence, subject to long-continued droughts; and as the atmosphere is always clear, and without clouds to shelter from the ardent rays of a tropical sun, it is much hotter than any of the other islands. The heat is also increased by the reflection from white dry sands upon the sea-shore. It is, besides, nearly destitute of springs; and the only water which they have is from wells, brackish and disagreeable to strangers, whom it is apt to purge.

The constant perspiration to which the inhabitants are subjected, and that increased action of the absorbing system, must, in time, produce atony, or a state of exhaustion; and the brackish water, which, I believe, is seldom used pure, by the male inhabitants at least, must tend to produce obstructions in the lymphatic glands, particularly of the extremities. Hence those frightful swelled legs, so disgusting to strangers, to be met with amongst the lower class of inhabitants; and those dropsical and anasarcaous swellings in other parts, to which the higher classes are subject.

Dr. Hendy has properly observed, that the glandular disease of Barbadoes has increased in an exact proportion with the clearing of the island and dryness of the seasons. And the same disease has been also observed in the island of Antigua, which is also subject to long-continued dry weather, from similar causes. It was long ago suggested to the legislatures of both islands, to purchase, at the public expense, the several elevated heights, and to plant them with trees of quick growth, and which would attain considerable size, to attract the rain, such as the East-India tick-wood, which has been naturalized to the West-Indies. It is a useful, durable wood, and grows quick and lofty. Perhaps the erection of metallic conductors upon the summits of the hills might also be attended with advantage.

Knowledge, however, of the remote and proximate cause of the disease does not lead to a more successful mode of treat-

ment. The glandular disease has hitherto baffled art. When far advanced, a change of climate has not even proved successful: it has always returned upon the patient. Perhaps the more frequent use of bathing, and oily applications to the surface, to prevent that excessive perspiration, might be found useful in preventing the disease. And the nitric acid, with the class of oxygenated medicines, joined to the external application of diluted nitrous or muriatic acids to the affected parts, might possibly be found useful in curing it.

I have only met with a few cases in my practice. The patients had either been born in Barbadoes, or long resided there. I tried the oxygenated muriate of pot-ash and nitrous acid with seeming advantage; but the disease returned again.

ARTICLE V.

A NARRATIVE of the MALIGNANT FEVER, with BLACK-VOMITING, which prevailed at Winchester (Virginia) and the neighbouring Country on the River Shenandoah, during the Summer and Autumn of 1804: Communicated in a Letter from Dr. ROBERT DUNBAR to Dr. MITCHILL, dated Winchester, November 22, 1804.

PREVIOUS to this date, I should have undertaken to write an account of the sickness which has afflicted this part of the country, but the duties of my vocation, to which I am under the necessity to attend, together with my convalescent situation from an attack of the fever, have rendered it wholly impracticable until this period. Previous to my entering on the subject of the disease, or a detail of its symptoms and nature, perhaps a few brief remarks, relative to the topographical situation of this place, may be acceptable.

The town of Winchester is situated in north lat. 39 deg. 17 min. west long. 78 deg. 39 min. It is the capital of Frederick county—is an incorporated as well as post town of this State—and is, perhaps, as flourishing an inland town as any in it. The principal part of the town is built on low ground, containing many handsome buildings, which gradually ascend in a latitudinal and longitudinal direction. Through the centre of the town runs a small stream, supplied by a spring a short distance nearly west of the town, from which the water is now conveyed in conduits or pipes throughout the principal streets,

and into the private habitations of many of our citizens. Several handsome buildings are erected to the west of the town, on elevated, and apparently healthy situations. Notwithstanding, the inhabitants of some of those dwellings were nearly the first that were attacked with the fever, which induced some to remove their families into the body of the town. Towards the east are several churches, belonging to different societies, pleasantly situated; and to the west and north-west, a handsome academy and poor-house. The number of inhabitants of this place is, perhaps, not much short of three thousand. In the year 1800, when the last census was taken in this State, there were 2117, of the following descriptions, viz. free white males 926, free white females 822, free negroes and mulattoes 22, and slaves 347. Since that period, considering the ratio by which population increases in this country, particularly that of inland towns, and the addition of inhabitants who settled here since, I may, perhaps, with a degree of certainty, estimate the present inhabitants of this place at nearly three thousand. For further information relative to this town and its vicinity, as well as the nature of the soil of this and the adjacent counties, I will beg leave to refer you to my friend Gen. John Smith, the Representative in Congress from this district. To give you a regular diary of the weather, from meteorological tables (which I have for some years kept), even for a short period previous to the commencement of the fever, would exceed the limits of a letter. Suffice it to remark, that in March and April, and to the 18th of May, the weather was, for the most part, cold, so much so as to retard vegetation considerably. Several days of continued rain occurred in that period. The clearing of the weather was accompanied with some thunder and lightning. From the 15th of May to nearly July there was rain in some part of every day, the wind proceeding mostly from the south-east; the mercury in Fahrenheit's thermometer, during this last period, ranging from 66 to 84 and 86. From the beginning of July to the 13th the weather was very warm, with occasional heavy showers; but from the 15th to the 22d the weather was fair, and extremely hot, the mercury rising to 94 and 96. Near the last of July there were three days of constant rain, close, sultry, and scarcely any air. Every substance susceptible of moisture became in some degree moulded; in consequence of which many of our merchants sustained considerable loss in the article of silk, it being much stained. A few cases of the fever occurred in July, and also of the dysentery; but in August the dysentery very much pre-

vailed, particularly in many parts of the country. In several instances it was mortal, but generally, when early application was made for medical aid, it yielded easily to the power of medicine. Few of those who had this disease were afterwards attacked with the fever; those that were, fortunately had it very easy. From the beginning of August the fever began to increase, and about the 18th or 20th it became pretty general. The symptoms of the disease were generally ushered in by chilliness, with occasional pains, which several persons experienced for some days previous to its severe attack. Pains in the head, back and limbs, were almost inseparable from the early stage of this disease. The pulse, in many cases, was full and frequent, yet soft; in others near the natural standard of health. These cases were generally the most dangerous. It appeared that every animating principle of life was prostrated to the over-bearing power of the disease. The face was flushed—the eyes assumed a red watery appearance. Often the appearance of the eyes served as a prognostic criterion by which to judge of the future force and malignity of the disorder. The tongue was covered over with a white frosty appearance, which was generally moist in slight cases. In the worst the tongue was covered over with a black appearance, interspersed with stripes of a blacker grade; for the most part parched and intensely dry; though in some of the very worst cases of the fever the tongue was morbidly clean (if I may use the term), shining in appearance like ripe fruit; and this red aspect, accompanied with moisture, was one of the first signs of recovery. The intellectual functions did not escape unaffected in every case of even inconsiderable danger; at the height of the paroxysm there was a degree of stupor, delirium and coma. The comatose state, in some cases, was present, or existed for some days, so much so that it was difficult to arouse the patient. Other cases occurred in which the patients, nearly from the first attack, were totally deranged, and completely maniacal. They did not know even their parents, or any inmate of the family. Every person present they were afraid of, and used every effort to escape from their presence, until restrained by the attendants. The head in those cases was particularly affected in such a distressing degree, that, notwithstanding such derangement of the intellectual faculties, and a total insensibility to every other object, yet their whole complaint was relative to the affected situation of their head. The stomach was very much disordered. Nausea and constant retching to vomit were general symptoms in the early stage of

the disease, and often continued throughout the whole period of the fever. In some cases these efforts produced no discharge; in others, on the first or second effort, very yellow bile was ejected (which appeared to be diffused through the whole system), changing by degrees in consistence and colour, assuming the dark green and blue (nearly resembling Prussian blue of the first quality), down to the complete black-vomit, resembling the sediment of very impure coffee. This occurred in three or four cases, two of which were mortal. Faintness, vertigo (in a partial degree), oppression of the præcordia, accompanied with difficult respiration, anxiety, and depression of spirits, were very frequent symptoms. Slight affections of the pleura, pains in the hypochondria and region of the stomach, descending through the intestinal canal, which could scarcely admit the slightest pressure, occasioned much complaint. Paucity of urine, accompanied with strangury, were additional causes of much distress. A few cases of scarlatina anginosa made their appearance during the early stage of the disease; but in a few days the reigning epidemic blended this disease into its own type.

It is a medical axiom, established by time, and sanctioned by the authority and writings of many ancient physicians, that no two epidemic diseases, unequal in force and power, can long exist together in one local situation. Drs. Sydenham and Hodges early remarked this domineering principle in the nature of epidemic diseases, particularly evinced and fully exemplified in the plague in London in 1665. This opinion is further substantiated, and incontrovertibly confirmed, by the writings of Drs. Huxham, Cleghorn and Morton. For the further confirmation of this axiom, I might advert to the ingenious and pertinent observations, relative to the subject, made by the celebrated Dr. Rush, from his Professor's chair, and published in his works. In short, all slight diseases prevailing in this country, during the period of the epidemic, had to do homage to its shrine, and assume its garb and aspect.

The duration of the paroxysms, at the commencement of the fever, was extremely various, from 12 to 20, 36 and 48 hours. It continued for that space of time without the smallest abatement, that could be termed an intermission, or even a remission. In a few cases nature seemed to make considerable efforts to accomplish a termination of the paroxysm by salutary sweating, which, as it was the more profuse, the more perfect and permanent was the relief obtained by it. The febrile action in the system gradually abated so as often to

produce a remission, and sometimes an intermission of considerable duration. This interval, in point of time, was very irregular: betwixt the stages of the paroxysms it assumed all the varieties of quotidian, double tertian, and quartan. Indeed, in some instances it was difficult, if not impossible, to class it in any of the usual distinctions of the intermittent fever. This anomalous appearance of the fever was most general in the vicinity of marshes, creeks, and mill-ponds. The regular tertian was generally the aspect it assumed, and, with respect to treatment, was the most easy to subdue: for when it was a quotidian or double tertian, the intermissions or remissions were too short in duration to accomplish any relief of moment, with the most *important remedies*, and administered with the most assiduous attention. In the first stage of the disease, before any relapse took place, we did not meet with any regular quartan.

The treatment adopted in the beginning of the disorder principally consisted in the use of emetics and purgatives. The purgatives were principally composed of the muriate of mercury and jalap. In most cases gentle emetics were given, which were pointedly marked with good effect in relieving nausea, &c. Where the stomach was extremely irritable, and the patient much debilitated, connected with advanced age, or when the patients were pregnant, they were never administered. Purgatives were divided into small doses, proportioned, in quantity and continuance, to the strength of the patient and the nature and force of the disorder, and were aided occasionally (*pro re nata*) by gentle clysters, particularly in all dangerous cases, where languor and debility much prevailed. Venesection was but little used, owing to the sudden prostration of strength which ensued in many cases from the first attack, as well as after the operation, unless it was considered pointedly necessary, from the apparent tendency to local affection. Blisters were early applied to the back part of the neck or forehead, as considered necessary, which very much relieved the affection of the head. They were also applied to the epigastric region, from which relief to the stomach was generally obtained; and, in the further progress of the disease, they were applied to the ancles and wrists, and other parts of the body. They were often aided by sinapisms, composed of stimulating ingredients, applied to the soles of the feet, with very apparent good effect, particularly when there was a degree of insensibility, accompanied with delirium and stupor. Embrocations, by the medium of flannel clothes

pressed out of warm spirits, to which sometimes was added strong acetic acid, were applied to the stomach, intestines, and lower extremities. This application often gave much relief, and apparent tone and vigour to the intestines, and aided the natural discharge of their contents, which object was previously obtained by administering injections. Cardialgia was an inevitable attendant on all desperate cases. This distressing affection was much alleviated, indeed almost generally relieved, by the use of alkalies, administered sometimes in combination with calcareous substances, but most generally (as being most agreeable to the patient) they were given by the medium of a syrup, for occasional drinks, with the most pleasing effects. Sal. tartari, to which was added sometimes crem. tart. p. e. from 3 s. to 3 ij. on which were poured of aq. bull. from 3 xii. to 3 xvj. prepared agreeable to the taste of the patient. Bark was administered in substance, decoction, and pills, combined with spices, when flatulence ensued. Every possible means was used to make the different prescriptions agreeable to the patients, and, at the same time, efficacious. When intermissions were distinctly marked, they were most pointedly embraced; and in dangerous cases, where debility was rapidly progressing, short remissions were closely watched, and the bark was given in every form which the patients preferred. We found much advantage by giving the bark even in those remissions, as having a powerful tendency to prevent the increasing debility and all its alarming concomitants. In cases of imminent danger, a remedy that will, even with a probable certainty, prevent a fatal event, ought not, on any consideration, to be dispensed with. Indeed, when even a slight remission could be obtained, in cases of pregnancy, which considerably increased the danger of the disorder, an early exhibition of the bark afforded the best chance of relief. In those cases we found a peculiar advantage derived from giving the bark combined with crem. tart. and a small portion of spices. Caryophylla was mostly preferred—about 3 i. to 3 i. pulv. cort. and 3 ij. crem. tart. mixed with wine (white or red, as thought most suited to the state of the patient) and water, one fourth of the former to three parts of the latter, increased or decreased as found necessary. This form of medicine often operated as a gentle laxative, and, at the same time, appeared to give vigour and much strength to the stomach; the obtaining of which was one of the most important desiderata in the treatment of those cases. At present there

are no new cases: those that do exist are the effects of frequent relapses.

The introduction of the cold weather seems to have some effect in stopping the lapsing predisposition. That extraneous and incidental causes, such as fatigue, intemperance in regimen or diet, and exposure to cold, wet, night air, &c. may and do produce relapses in this fever, as well as in common intermittents, is a fact too notorious to be denied, or even contradicted. But in the fever which existed with us, I am well and indubitably convinced, from my own convalescent situation, and also from knowing the situations of a great many others who were totally exempt from the afore-mentioned exciting causes, that there is an indescribable something in the nature of the poison which produced the malignant fever which existed in this part of the country, and also in many other parts of the Union, that causes it to act on the body, and thereby disposes it so much to relapse. Whether it is the assimilating principle which exists in the human system, by which it is enabled to accommodate itself to the nature of noxious situations, and temperature of almost every clime? Whether this inherent or innate principle will sufficiently elucidate, and satisfactorily explain, why the system, after it has become inured to this poison for some time, ceases to be affected by it, but, at the termination of a certain period, loses that habit, and is again morbidly excited into action?—Now, whether these premises, aggregately considered, will warrant me to conclude, by asserting that this accommodating principle which exists in the human system will fully account why so many relapses take place after an attack of this fever, I will not positively assert: to your superior judgment I will submit the decision. In many relapses which took place in this town and its vicinity, they assumed a periodical type. Some relapsed regularly for several times, at the interval of a week; others two weeks, and a few solitary cases of three weeks. That relapses do frequently take place, and also that they are often attended with very great danger, is a notorious fact much to be lamented; and not to be able at all times to prevent them (as several relapsed, even when in the continued use of the most suitable medicine), amounts nearly to an opprobrium medicorum. This has been the cause of much complaint by those who were attacked with the epidemic fever throughout this country in general, and of much mortification to all our physicians.

From a review of the imperfect statement I have given of the disease which swept away so many of our citizens, you will easily perceive its identity to the yellow fever which so often existed in New-York. The sallow appearance early apparent in the countenance, and over the bodies of those attacked with the fever, was a luminous proof of the presence of a preternatural secretion of bile, which was a never-failing concomitant, not only from the first commencement of the disease, but also to the termination of a tedious and lingering convalescence. Marsh miasma, aided by the effluvia emitted from so much vegetable putrefaction, brought powerfully into action by an excessive hot sun, producing such a morbidity of atmosphere (if I may use the expression), has been considered as the first exciting cause of our epidemic fever.

Such is a brief statement of the disease which existed lately, and raged with such violence in this country, its introductory symptoms, &c. as well as the outlines of the treatment adopted by my colleague, Dr. Macky, (a gentleman of the first medical talents) and myself, in this town and a large extent of country. Creeks, marshes, and mill-ponds, were embraced in the precincts of our practice in the country, which enabled us to see the worst cases of the fever, and the different aspects assumed by it in all stages.

ARTICLE VI.

CASE of MONSTROSITY: *Communicated in a Letter from Dr. JESSE F. JONES, of Martin County (North-Carolina), to Dr. MILLER.*

SIR,

OBSERVING in your useful Repository an invitation to all to communicate those cases which occur in practice, which are uncommon, and thinking this a singular one, I am induced to send it for your perusal. Should you think it worthy of a page in that publication, you are at liberty to dispose of it as you may think proper. The facts are simply stated, without any comment of mine.

In March, 1799, I was called to the assistance of a negro

woman in labour, belonging to Mr. I. T. When I arrived I found her very much exhausted. Her pains had almost left her, and those she had returned at long intervals. I was informed by the attending midwife that she had been in labour twelve days; that the waters had been discharged eight days; that she had tried every method to deliver her, but could not, nor could she tell what part presented; that she believed the child grew to the womb, or that there were two children growing together; and that the patient was so exhausted that she could not live without immediate assistance. After asking the patient some questions, I gave her a cordial to recruit her strength and spirits, and examined her. I found the external parts considerably dilated, the os internum largely open, and the foetus resting in the lower part of the pelvis. I at first conceived that the nates presented, but on further examination found it to be the head; and what surprised me was, although I could distinctly feel one ear, I could not find the other. I then attempted to find the nose, but could not. In searching for the nose my fingers slipped into an aperture, which I supposed to be the mouth, but the uncommon size and shape made me for some time doubtful. However, as no time was to be lost, and being satisfied that the foetus was dead, I concluded that a considerable collection of water in the head, which had distended the containing parts to a large size, was the cause of the delay of parturition, as the pelvis was of the common dimensions, considering the small stature of the woman; and I therefore determined to perforate the scalp, which I did with a pair of sharp-pointed scissars. The contents of the cranium instantly gushed out with a large quantity of water; the head was diminished to the ordinary size; and the child being small, was easily delivered. It appeared not to have been long dead, as the cuticle had no where been separated. On inspection, no deformity appeared upon its body or limbs. The head had been much distended by the dropsy. The chin and under lip appeared natural. The upper lip, in the middle part, for more than half the width of the mouth, together with the bones of the maxilla superior, were wanting, and appeared, when the mouth was shut, as if a square piece had been taken out of the upper lip and jaw. No vestige of a nose was to be seen: the face, below the eyes, a little depressed: the right eye very large and prominent, so that the lids did not cover it: the place where the left should have been was a little depressed: the eye-lids imperforate: a small seam appeared,

much like the scar of a well united hare-lip, after the operation has been successfully performed: the right ear somewhat larger than usual: the left ear entirely wanting—the skin appearing smooth and even on that side of the head. It was a male.

I have had several singular cases in the course of my practice, but have not been careful to take notes of all, as at that time there was no publication which admitted them, within my reach.

In 1793 I saw a child after a delivery in the eighth month, whose scalp, together with one half of the os frontis, and as much of the os bregmatis, were entirely wanting: the brain was covered with the pia and dura mater only. The mother informed me that she was much frightened at seeing an execution while pregnant, which caused her to faint, and that she had never been well, as in former pregnancies, after that time.

ARTICLE VII.

OBSERVATIONS on a CASE of STRANGULATED HERNIA:
Communicated in a Letter from Dr. CHATARD, of Baltimore, to Dr. MILLER.

NORBERE BELAIR, surnamed the Picard, a sailor who had deserted from the French frigate *Poursuivante*, requested me to visit him on the 20th of last February, at five o'clock in the afternoon, on account of violent illness. I found him in bed, with high fever, occasioned by the strangulation of an inguinal hernia, which had taken place five hours before, from his exertions in loading a cart, while unprovided with his truss, which he had generally worn for the two preceding years. As this man was of a robust habit, I ordered him to be bled to twenty-five ounces, and then attempted to reduce the hernia by the *taxis*; but in this I was unable to succeed. I directed him that night to go twice into the warm bath, and to remain in it two hours at each time, and, in the intervals of the bath, to apply a bread-poultice. On the 21st, at eight o'clock in the morning, he continued in the same situation, and his fever being still high, I determined on a

second blood-letting, nearly as copious as the first. The baths, the poultices, the injections, were used, one after another, for twenty-four hours, with great exactness; and, in addition, I ordered a grain of opium to be given every sixth hour to relieve the violent pain, the hiccup, and the vomiting. Every thing was unavailing; and at the beginning of the third day no change had taken place in the condition of the unhappy patient. I thought it my duty to urge the operation as the last resource; but he obstinately opposed it, and declared he would rather die than submit to it. Having much confidence in the treatment used in this case, as I had often seen it succeed under the direction of M. Desault, after persevering in it many days, I insisted on the employment of the baths, the injections, the poultices, and the opium, as before, during the six first days, but they were not used with perfect exactness; and still every day I continued to urge the operation, which was firmly and steadily rejected. At the end of the time just mentioned, the patient, who could take nothing without rejecting it from his stomach, became extremely weak, and appeared to me to be in a desperate situation. Still, however, I continued to visit him as frequently as I could, as well to encourage the assiduities of those to whose care he was committed, and who were beginning to grow weary of their duty, as to observe the progress and termination of a case which seemed to assume a singular character. It was not till near the close of the fifteenth day of the disease that the patient breathed his last. On the twelfth day of the disease he still had strength enough to walk from the cellar in which he lay to a kitchen situated above, and at the distance of some paces from it; where he ate eggs, meat, bread, and drank tea, with very great appetite, and retained these things on his stomach for several hours. During the whole course of the disease he only discharged by the anus the water of the injections, after those first administered had emptied the large intestines of the excremental matters contained in that portion of them which was below the strangulated part.

About the sixth day the hernial tumour seemed, by imperceptible degrees, to grow smaller, and on the twelfth I observed a fluctuation at the bottom of it, which led me to apprehend that possibly an opening might take place there. But this apprehension was rendered doubtful by the skin having undergone no change of colour; and it continued to show the same appearance several hours after the death of the patient,

when I performed the operation in order to satisfy myself as to the nature of the disease. The hernial tumour was then of the size of a turkey-egg, of an oblong figure, descending into the scrotum, and from four to five inches in length. I found the peritonæum thickened to one fourth or one third of an inch, adhering to the skin and to the omentum, which formed a large proportion of the hernia. The omentum was so condensed and indurated that it was difficult at first to distinguish it; and the testicle, exceedingly diminished in size, was enveloped in it. I observed no appearance of gangrene in the omentum, except at the lower part of it, which was black for about the extent of an inch, and reduced to a sort of ill-conditioned matter, rendered thin by the serous fluid, which, as I observed before, began to be formed about the twelfth day of the disease. So far I had been unable to discover any intestine, although it was plain that some part of that canal held an important share in the disease. I determined to divide the omentum to within two inches of the abdominal ring, and I there found that it enveloped the intestine in its superior part as it did the testicle in its inferior part. This portion of intestine was strangulated by the ring for about an inch, but the appearance of it had undergone little alteration. This made me regret that the patient had not consented to undergo the operation even in some of the last days of the disease; as there is reason to believe that, even then, his life might have been saved by it.

Although this case does not afford the satisfaction of having been successful, it seems to prove that the treatment employed sufficed to support the life of the patient during a principal part of the time of the disease, and that it would finally have succeeded if his obstinacy had not prevented it.

I can also state, in favour of this treatment, another case more fortunate, in which I was consulted by my partner, Dr. Dunan. This practitioner was called to visit Mr. V. who had been attacked with the same disease. After having fruitlessly used attempts to reduce the hernia, and having tried the application of ice, he invited my assistance in the case. My opinion was, that it would be advisable to use the remedies employed in the former case in the fullest extent. Accordingly the patient was twice bled, he received injections, took three grains of opium, and was kept immersed in the warm bath for 42 hours, at the end of which time the hernia was reduced of itself, without any external aid.

I know of no practitioner, before myself, who has undertaken to prolong the continuance in the warm bath so far; and M. Desault, although strongly attached to the remedy, only ordered it for a few hours, with the direction to repeat it afterwards. But I have supposed that no other limits ought to be placed to the use of the remedy but the weakness of the patient, who, if well nursed, and vigilantly watched, may be withdrawn from the bath on the least appearance of syncope.



 REVIEW.

ART. I. *A Tour through the British West-Indies, in the Years 1802 and 1803, giving a particular Account of the Bahama Islands. By Daniel M'Kinnen, Esq. 8vo. pp. 272. London. White. 1804. With a Map.*

TO the inhabitants of New-York, the author of the present work is known both as a former resident and as an author. From him have they received two works, the tendency of which is to describe and celebrate their country. His description of the *Region situated south of Lake Ontario* was a respectable composition in prose; and the *Hudson* and the *Mohawk* can bear witness of his powers as a poet.

Since Mr. M'Kinnen left us, we find that his activity has in no degree abated. As he travels from one part of the globe to another, he carries with him the spirit of quick observation and useful inquiry: and his tour through New-York is succeeded by a voyage to the West-Indies.

The perusal of this publication has given us pleasure. The design is liberal, and the execution manly. Though not designed to be a profound work, yet in some parts it interests by its variety, and in others it gratifies by its originality. Indeed, it may be considered as affording useful additions to our knowledge of the physical geography of the Bahama Islands.

The author relates how he sailed from England to Barbadoes. After some account of that most windward of the Caribbees, he describes his passage to Dominica, in sight of St. Vincent's, St. Lucia, and Martinique. From Dominica, of which he has inserted a sketch, he proceeded to Antigua. After a general description of this, he tells how he returned along the eastern shore of Guadaloupe, and through the straits which the south point of Grande-Terre forms with the mountains of Deseada, to Barbadoes, and thence sailed for Jamaica. After a short stay, during which he made an excursion to the Liguanea Mountains, he proceeded to the Bahama Islands.

Barbadoes is mentioned (p. 6) "as elevated on a ridge of calcareous rock, which rises from 30 to 50 feet, or more, above the level of the beach, and forms a sort of promontory round the north-eastern part of the island. The

coast, wherever I had an opportunity of observing it, is lined with white coral, and the strand is of a beautiful light and soft sand, composed apparently of the pulverized rock and marine exuviae."

On the chain of islands situated between North and South America, Mr. M'K. has the following remarks.

"Many persons observing the mountainous appearance of the islands, and tracing a ridge, as it were, from the north-east point of South-America, which projects into the ocean at the *Bocas*, or high rocks in the channel between Trinidad and the main land, through the windward and leeward islands, Porto-Rico, Hispaniola, Jamaica, and Cuba, almost to the mountains west of the Mississippi in North-America, have been induced to suppose that a violent current of water, impelled by the continual easterly winds into the American Archipelago, has gradually overflowed the low land, and left only the more elevated above the surface of the sea.* Notwithstanding, however, the ingenious speculations of naturalists, the formation of the globe, and the inequalities on its surface, are matters as yet too much involved in obscurity to admit of any satisfactory discussion. But there is no just reason to suspect that the earth is of anterior creation to the sea, which this hypothesis assumes: on the contrary, the direct reverse of such a supposition is most consonant with appearances. In many parts of this region the low land seems a mere concretion of marine and organized substances, and the rocky parts appear to have been covered and acted upon, at some period subsequent to their original configuration, by the sea. The coasts, in general, do not run out in bluffs, and exhibit fractured strata, which might have been expected from any violent action on the land by the ocean's water; but the smaller hills and eminences rise gradually from their bases, for the most part in regular and composed forms, very much inclined to the figure of Vesuvius and other volcanic mountains."

He saw the volcanic smoke and sulphur on the mountains of Dominica (p. 46). From these no flame nor commotion has arisen, though the internal fire continues, and a sulphureous spring of water, hot enough to boil an egg in three minutes, bursts out from the side.

"Antigua," he says, (p. 68) "does not present the same

* "The Abbe Raynal, and some earlier writers, have advanced this opinion, though it is not adopted by more modern theorists."

appearances of the action of volcanic fire as most of the Caribbean islands; although I was inclined to think there are traces of it in the mountainous parts, from the stones I observed resembling tufa, which had apparently undergone fusion." (P. 55.) "The interior, with the exception of some high spots of stony ground and tracts of pasture, exhibits a level and well-cultivated surface of rich cane-land. In the low situations, the soil, where I had an opportunity to observe it, was often tinged with clay or calcareous marl, and in the most valuable spots, assumed the colour of a fine chocolate-brown."

But the most important part of this work is that which relates to the Bahamas. Of these, as lying at no great distance S. E. of our southern coast, and situated exactly in the course of our vessels bound to and from the Caribbees and Leeward Islands, we are desirous of procuring every additional piece of information. We accordingly extract the author's general description of these islands, of Turk's Islands, the Caicos, Heneagas, and the Hogsties.

"The Bahama Islands, which may be said to be connected by Porto-Rico and St. Domingo with the series of Caribbean Islands, lie at a considerable distance to leeward of them, in a diagonal line, running south-east and north-west, nearly seven hundred miles in extent, between the 71st and 81st degrees of west longitude, and the 21st and 28th degrees of north latitude. From the names given by the aborigines to the two largest islands, situated at the north-western extremity of the range, they have been sometimes called the *Lucayas*,* or more generally *Bahamas*. The greater islands, or rather groupes of islands, may be esteemed fourteen in number. The smaller, it has been computed, amount to at least seven hundred; though I suspect an exact enumeration of them, from the intricacy and subdivision of many of the islands, comprehending rocks and sand-banks, would be an undertaking scarcely worth the labour.

* "Or Lucayos. The Spanish geographers, speaking of the Lucayos, in the earliest accounts, confine them to three different clusters, lying east of the Florida stream, and admitting three distinct entrances into it, at present called the Providence, the Santareen, and the Nicholas Channels. Under this subdivision the Lucayos were described as the *Bahamas*, the *Organos*, and the Islands of the Martyrs. Herrera, vol. ii. chap. 5.—It occurred to me, on recollecting the *Leucadia* of the ancients, that these islands, which are also remarkable for a white calcareous rock, might have derived their name from the same quality. *Lucaya*, or *Yucaya*, however, is an Indian word; and it is said the islands were generally called *Lucayas* by the natives."

"Although the geographical divisions of the globe are generally founded on some analogy between the component parts, as the Caribbean Islands, which may be classed together from their volcanic appearance, and the similarity of their climate and natural productions, it occurred to me, before I visited the Bahama Islands, that on passing the north tropic, and traversing so great an extent of ocean as they occupy, some marked and essential differences would be found between the islands at the two extremities of the chain: but in this I was deceived; for, I believe, there are strong characteristic resemblances in climate, figure, soil, and in the animal, vegetable, and fossil kingdoms, which may properly serve to unite them in the same family. Lying, as they do, in one of the most serene, genial, and (through a great part of the year) delightful climates in the world, and yielding by cultivation most of the vegetable productions of the temperate as well as of the torrid zone, it might seem strange that they have not hitherto become generally settled. But from the intricacy of the navigation between them, as well as the unproductive nature, or rather deficiency of the soil, they have attracted, perhaps, less notice than any other parts of the British empire: I therefore determined to see as much of them as time and circumstances would admit, though with little other incentive or qualification than curiosity to direct my inquiries.

"These small oblong bodies of land, bounding the Atlantic Ocean on the north-east of the large island of Cuba, and reaching over an extent of ocean commensurate with its length, rise almost perpendicularly from an immense depth of water, and seem to have been formed, if external appearances may be trusted, from an accumulation of shells or small calcareous grains of sand. The land generally seems low, and its surface and figure throughout the islands is very nearly the same. At the utmost depths to which the inhabitants have penetrated, nothing has been found but calcareous rock, and sometimes an intermixture of shells. At a small distance from the shores, a reef of rocks, in many of the islands, is observed to follow the direction of the land, and form the boundary of the soundings: without this rampart the ocean is often immediately unfathomable; within it, the bottom is either of a beautiful white sand, or checquered with heads (as they are termed) of rocks covered with sea-weed.

"The principal islands, or clusters of islands, to enumerate them in their longitudinal inclination from south-east to north-west, are,

- " 1. Turk's Islands.
- " 2. The Caucos or Caicos.
- " 3. The Heneagas.
- " 4. Mayaguana.
- " 5. Crooked Island groupe.
- " 6. Long Island.
- " 7. Watlings.
- " 8. The Exumas.
- " 9. St. Salvador.
- " 10. Eleuthera and Harbour Island.
- " 11. Providence.
- " 12. Andros.
- " 13. Lucaya or Abaco.
- " 14. Bahama.

" Besides these islands, there are two extensive sand-banks, which underlay a wide expanse of ocean, called the Great and Little Bahama Banks, the boundaries of which are, in many places marked by an indefinite number of quays* and islets.

" The Bahamas will be ever remarkable in the history of the new world, from having been first discovered by Columbus, on an expedition of the greatest enterprise and importance that was ever undertaken on the seas. At that time they were filled with inhabitants, who welcomed his arrival on their humble shores with pleasure and hospitality. But in a few years, as I shall have occasion to mention more particularly in the sequel, these islands were completely depopulated and forsaken till the conclusion of the American war; since which they have afforded many of the distressed royalists a precarious, and, perhaps, temporary settlement.

" The principal produce of the islands consists of cotton, salt, turtle, different species of fruit, mahogany, dyeing and other woods or barks. A considerable source of profit is found, by the maritime part of the community, in administering to the distresses of those who are wrecked upon the numerous rocks and shoals with which these islands are beset.

* " Quays are described as ' small sandy islands, appearing a little above the surf of the water, with only a few bushes or weeds upon them, and abounding (especially at any distance from the main) with turtle and amphibious animals. Turtle choose the quietest and most unfrequented places for laying their eggs, which are to a vast number in the season; and the quays would be seldom seen but for this, except by pirates. Vessels from Jamaica and the other governments make voyages to them, called turtling. Some quays which have been in continual view, as those nigh Jamaica, are observed, within our time, to be entirely washed away and lost, and others daily wasting.'—*Introduction to a General History of the Pirates*, by Capt. Johnson, p. 24."

"*Providence*, being the present seat of government, concentrates all the trade and consequence of the islands; and to this place I naturally directed my course, as the principal object of curiosity and source of information: but the want of any immediate communication, which detained me some considerable time in the out-islands, afforded as well the opportunity of examining what occurred most worthy of observation where I remained, as of collecting information near at hand, respecting the islands which I passed without personal observation. Of one or two of these islands my tour will furnish a particular account; and, I believe, from the great analogy they bear each other, a pretty correct general idea of them all. But I will notice the principal islands before enumerated, and a few of the others, as they engaged my attention in sailing through them towards Florida, beginning at the south-eastern extremity, where they approach St. Domingo.

"It may be said, with respect to many of the Bahama Islands, that you have your choice of three names, given to them at different periods of time, by the English, the natives, and the Spaniards. The *natives* generally described them by some peculiarities which at present cannot always be learnt; for their language has almost perished with their race. The denominations of the *Spaniards*, which appear in the older charts, seem to have been arbitrary, and, like their dominion over them, but transitory. The few English names which may be traced are founded on some natural allusion made by our sailors, to whose roving and intrepid spirit we are indebted for this colony; its sands and rocky shores, abandoned and avoided by other nations, affording them, for many years, a favourite and congenial retreat. To them we may ascribe the present denomination of this small cluster of islands. In the old charts they are called *Las Amanas* by the Spaniards, who derived that name, I believe, from the natives. They abound with a dwarfish species of the cactus (*cactus coronatus*, or *cactus nobilis* of the botanists), vulgarly called the *Turk's head*, from a most striking and singular resemblance the plant bears to a Turkish cap; which circumstance must have given rise to the present appellation.* One otherwise would be as little likely to guess at their proper location, as a post-master in England, who, not having heard of any colony of the Grand Seignior in the West-Indies, sent

* "In the French charts they are called *Les Isles Turques*; and perhaps the French may be the authors of their present name."

off a letter directed, some years ago, to a person in the *Turk's Islands*, to Constantinople.

"These small islands are of some consequence in this government, from the quantity of salt they produce in natural ponds. The calcareous rock, of which the land is composed, lies generally in horizontal layers. From the violent action of the sea, which has evidently, and perhaps recently, beaten over them, the surface every where appears worn, fretted, and broken into holes, or often deep excavations: hence the ocean-water finds a passage, and has formed, in many parts of the interior, extensive *salinas* or ponds. Although the inhabitants of the other islands, perhaps, amongst other causes, owing to a more northern position, have not hitherto much attended to the great natural advantage of their salt-ponds, little doubt seems at present entertained of their becoming a source of considerable profit, from the quantity of salt produced, and the facility with which it may be obtained. For early in the year, when the power of the sun begins to increase, accompanied with dry weather, the salt every where in these natural ponds begins to crystallize and subside in solid cakes. It remains then only to break the crystals, and rake the salt on shore; and by this easy mode a single labourer may rake from forty to sixty bushels of salt in a day. The process, however, is facilitated by making small pans, which, as the salt is taken out, may be replenished with brine from the pond. The two principal ponds from whence the salt is obtained in this cluster of islands lie at that which is called the *Grand Turk*, and at a smaller island, called *Salt Key*, on the south side of it.

"The island called *Grand Turk* may be about twelve miles long, and, at a mean, two miles broad from east to west. The soil, which is sandy, admits but of little cultivation, and produces only a small quantity of Guinea corn, an agreeable and nutritious grain, which is universally cultivated throughout the Bahamas.

"The principal pond on the island is considerably more than a mile in length. There are also some of less note, and particularly one near a harbour on the east side of the *Grand Turk*, from whence some small quantity of salt is obtained.

"The resident inhabitants are few in number. Before the American war they amounted to about eighteen white heads of families and forty slaves; since which period there probably has been little increase. I mention the *resident* inhabitants; for in the early part of the year, when the salt begins to make, a number of periodical visitants, from the *Bermudas*,

come over for the purpose of raking it. All those who are present on the 10th of February being enumerated, allotments of the ponds are made, and staked off to each person in proportion to the number of hands given in to be employed in raking salt for the ensuing season. The amount of these annual visitors cannot be calculated with precision. Early this year two hundred had arrived; and I was informed they sometimes number between one and two thousand. The pans which the salt-rakers generally lay out are not all of equal dimensions, but depend on each individual's judgment or experience. I saw, elsewhere, some nearly sixty feet square; from whence it was calculated, I do not know with what exactness, that at least five hundred bushels of salt might be raked in a good season. But in Turk's Islands the pans are generally smaller; they are filled with the brine about six inches deep, or so as to cover a man's ancles; and a moveable machine, like the wheel of a water-mill, but turned by a handle, throws the water from the pond into a gutter, from which the pan is conveniently and readily supplied.*

"The Spaniards who first discovered these islands, more intent on the search of gold than of salt, passed on to *Cuba* and *Hispaniola* without effecting any settlement. It is little more than a century since they have been first visited or claimed by the English. The only Europeans who ever contested our pretension to the possession were the French: they attacked it some years ago without success. The right was afterwards discussed by the courts of the respective countries, and the claims of the possessors admitted and sanctioned by the French government.

"A free port is established at the Turk's Islands, which admits the Americans, their principal customers, to carry away the salt in their own bottoms, subject to a duty of two shillings and six-pence, Bahama currency, (eight shillings to the dollar) per ton, payable to the crown. The receipts of the last year, at the office of the customs, amounted to two thousand two hundred and thirty pounds sterling. The colonial government has also imposed a further duty on all salt exported: but an exemption is strenuously claimed by the inhabitants; who disavow any connection with the Bahamas, and, although called upon by a law of the colony to delegate a representative to the assembly of the legislature at Providence, have totally

* "The salt now (March, 1803) sells at one shilling and eight-pence sterling per bushel on the spot."

refused to recognise its authority. The circumstance of the annual migration of most of the inhabitants, the distance from the seat of the Bahamas' government, and the trade wind, which, though favourable to reach Providence, renders the reciprocal communication both difficult and tedious, are reasons urged in favour of the convenience of attaching them to the colony of the Bermudas. It is also insisted that his majesty has sanctioned them in a sort of palatinate government, by appointing a person to reside there in the character of an agent of the crown. On the other side it is strongly contended, that this is merely a factious attempt to call in question a legitimate authority from motives of private convenience, which has eternally disgraced and embroiled our infant colonies. The question (which cannot be of very difficult solution if the right is merely precarious) is submitted to the proper tribunal, the king in council, and a speedy decision will probably put an end to this political dispute.

"In proceeding towards Providence, the next collection of islands that you meet with, lying in a north-westerly direction from the Turk's Islands, are called the *Caicos*, or, as our sailors more familiarly pronounce them, the *Caucus*. Their name, I believe, is of Indian origin, and may be derived from a species of native plumb-tree. They lie in the form of a crescent, opening to the south, and are separated from each other by narrow passages. Besides the Keys, or smaller islands, lying south, they are distinguished by the names of the West, the East, the Grand and Middle Caucus. The soil of the middle islands, which have principally invited settlement (and particularly some spots of clay), is the most esteemed of any in the Bahamas. There are two sugar plantations recently established at the Caicos; but the staple commodity produced is cotton. Of the general state of the agriculture of these and the other islands, I shall be enabled to furnish a correct idea when speaking more particularly on the subject hereafter, from authentic documents in the proceedings of the legislature of the Bahamas on a recent investigation of the subject.

"The different West-India fruits come to perfection in these islands. I tasted some oranges produced at the Caicos of excellent flavour. Horned cattle, on a comparison with the adjacent islands, succeed well: and I saw some very good hogs bred there; a species of stock which thrives most remarkably in all warm climates.

"Previous to the peace of Paris, in the year 1783, when many royalists removed to the Bahamas, there were not more

than thirty acres of land cleared in all the Caicos. But in the course of five years succeeding, twelve heads of families, and between two and three hundred slaves, were enumerated on the islands; since which period I have not learnt the exact amount of the population. One gentleman alone, it is said, has six hundred negroes employed on his different plantations. But there is too much reason, at present, to anticipate a diminution rather than an increase of numbers. A port of entry is established at the Caicos, but they have not, as yet, sent any delegate to the General Assembly at Providence. Although the land is rocky and much broken, the indefatigable inhabitants have made roads adapted for carriages; and if nature would smile on their meritorious efforts, it would soon become a populous and flourishing country: but, I am sorry to say, the prospect of the future is wrapt in a gloomy despondence.

“Various traces of the aborigines (who in numbers much exceeded any population likely to ensue) have been discovered at the Caicos: amongst others, utensils formed of clay, and a hatchet of stone, curiously embossed with a dolphin's head. In a cave, some skulls, I was informed, had been recently taken up, which, on being touched, immediately mouldered to dust. An old road traversing one of the islands was also found by the first settlers, which they ascribed to the Indians; for the Spaniards, although they exterminated the inhabitants, were indifferent about their country, which they deemed not worth the possession.

“In a south-westerly direction from the Caicos lie the two islands of Great and Little *Inagua*, or, as, to accommodate them to an English pronunciation, they are now generally called, *Heneauga*, or *Heneaga*. The original is a Spanish compound word, signifying that ‘*water is to be found there*’; which, to those who frequent the neighbouring scenes of flat and desert keys and sands, is an object of no small consequence.

“Great Heneaga has been hitherto but little known from any other circumstance than the number of shipwrecks which it has occasioned by its position at the mouth of the windward passage, the frequented straits between Cuba and St. Domingo. A dangerous reef lies at some distance off the shore; and, from the strength and uncertainty of the currents, vessels are continually and unexpectedly driven upon it. In the month of August, in the year 1800, the *Lowestoffe* man-of-war, and eight Jamaica ships under her convoy, were unfortunately cast away and destroyed on this treacherous coast.

"I passed the Great Heneaga on a very boisterous evening in February, towards dusk; and, being carried considerably to the westward of the strait course by a current from the east, had no opportunity of distinctly observing the land, which was low and at some distance. A few days afterwards I was informed that two square-rigged vessels were just cast away on the reef; and it was supposed by the captain of a small wrecking vessel, who gave me the information, and had seen their boats upset, that the crews must have perished in attempting to land. He had endeavoured to approach the wreck, but was prevented by the violence of the wind, and the breakers on the reef intercepting the shore. Little hospitality, at that time, could have been expected on the island, as it was inhabited by only one fugitive outlaw from *Long Island*, accused of having committed there a wanton murder on his innocent slaves. Some few families, it was said, were on the point of removing this year to Heneaga: for the Bahama Islands constitute, as it were, a large family; and though dispersed over an extended and thinly-peopled space, their individual projects and concerns are easily known to each other from water communication and the wreckers frequenting their harbours. The new settlers are invited to *Heneaga* principally by the salt-ponds, to which object the inhabitants of the Bahama Islands have this year (1803) very generally turned their attention.

"At the distance of about ten or twelve leagues to the northward or north-west from Heneaga, are some small keys, with wings or reefs of rocks on each side, in form of a horse-shoe, which admit a passage from the east, and form a sort of harbour. They are styled in the French charts '*Les Etoiles*;' and by us, perhaps through reproach, '*The Hogsties*.' Lying, as they do, in a very frequented part of this sea, I was surprised to find that neither Heneaga nor the Hogsties had as yet been correctly surveyed. They are minutely known only to those persons called wreckers, who are licensed by the Governor of the Bahamas, and cruise amongst these islands for the benefit of salvage, which they receive on all property they may chance to rescue from the waves. Some cocoa-nut trees have lately been planted on one of these keys, as a warning to mariners; but it is doubted whether the wreckers, whose business it is to prey on the disasters of the unwary, will suffer them to grow up, even should the soil permit. Perhaps, however, this may be a surmise, originating in the prejudices and feelings of many of those who have been unfortunate sufferers by shipwreck,

and who generally inveigh against the rapacity of the wreckers.* The merit and utility of a set of men, however, cannot be denied, who, whatever may be their motive, with alacrity and courage continually encounter the hardships of a dangerous sea, to preserve the property, and often the lives, of their fellow creatures from destruction. The inhabitants of the Bahama Islands, previous to the American war, when the loyalists from the southern part of the United States removed to them, and introduced the general cultivation of cotton, were principally engaged in a sea-faring life; and, from a lively allusion to the large and beautiful species of shells with which their shores abound, by their visitors were nick-named *Conchs*. These are the persons generally employed, with their slaves, in the occupation of wrecking; and, if the many amusing stories related of them are true, they possess a distinguished share of the address and enterprise of British sailors. It would be a little credulous to pay attention to all the marvellous occurrences, which come to us often exaggerated by the imaginations and vanity of the relators; but I heard a sin-

* "Happening, in the course of one of my passages through the Bahamas, to fall in with a wrecker, I held as long a conversation with him as his haste would permit, and was inquisitive on the subject of his occupation. I will set down the dialogue as it took place.

"Q. From whence came you?

"A. (As it caught my ear.) From Providence—last from *Philimingo Bay* in *Icumey* (a familiar way of pronouncing *Flamingo Bay* in *Exuma*.)

"Q. Where are you bound to?

"A. On a *racking* voyage to Quby (Cuba) and the westward.

"Q. Are there many of you in this quarter?

"A. Morgan, I, and Phinander (Fernandez)—parted company awhile ago.

"Q. What success in cruising?

"A. Middling—but middling.

"Q. We have seen very few wreckers to the eastward—are there many to the westward?

"A. We lay with forty sail four months along *Floriday* shore.

"Q. Forty sail! Then certainly you must have had many opportunities of being essentially serviceable to vessels passing the Gulf-stream, by directing them to keep off from places of danger, with which you made it your business to become acquainted?

"A. Not much of that—they went on generally in the night.

"Q. But then you might have afforded them timely notice, by making beacons on shore, or showing your lights?

"A. No, no, (laughing): we always put them out for a better chance by night.

"Q. But would there not have been more humanity in showing them their danger?

"A. I did not go there for humanity: I went *racking*. (In truth, as strong an apology as any that can be suggested for it.)"

gular adventure from the person to whom it happened, attested by many present, who were acquainted with some of the circumstances, which may be worth repeating, as it serves to illustrate as well the hardships and dangers to which the *Conchs* are often exposed, as the resources with which they are enabled to surmount them.—A fisherman at anchor in a boat, while attentively employed in casting his nets at a small distance from the shore of an adjacent island, towards the dusk of the evening was surprised by a sudden gust of wind coming off the land. His boat, notwithstanding all his exertions, was soon driven from her mooring, and, drifting before the wind out of sight of land, was exposed to the swell of an increasing sea, which overtopped and threatened to overwhelm her every instant as it passed. The boat continued, however, to float till the night was somewhat advanced; and, in the awful expectation of his fate, the fisherman, who now had scarcely any thoughts of relief, heard the sound of breakers at a distance. This, which at another time would have excited the greatest alarm, afforded him, at that desperate crisis, a ray of hope. Scarcely had he begun to distinguish their foam in the darkness of the night, when he found himself plunged into the midst of them, and his boat dashed upon the rocks on the eastern edge of the Great Bahama Bank. At a small distance from these rocks lay a key or bank called *Ragged Island*; and, floating almost senseless on the water, he was flung upon this desolate island. Though now preserved from the waves, there was neither water nor food to be found on the key, which produced only a few fruitless shrubs. But as he had been accustomed to dive for conchs, which abound in many places on the coasts of the Bahamas, he swam to some distance from the shore, and fortunately, on searching the bottom, discovered a sufficient quantity of these shell-fish for his subsistence. For nearly six weeks he lived entirely on conchs, their liquor supplying the place of water. During that time, having erected a signal on shore, he observed several vessels pass without noticing it: but so well reconciled had this Crusoe become to his desert island, that he declared, when taken off, had his wife been with him, he could have lived very happily there for life.

“The next island, proceeding in a north-west course from Turk’s Islands, which, from its size, would attract one’s notice, is Mayaguana. Its south-west point lies west-north-west twenty-five leagues from the west Caicos, and eighteen leagues north-east by east from the Hogsties. As yet it is uninha-

bited, and known only to mariners. I met with two or three sailors, part of the crew of a brigantine which had just been cast away on its eastern point, who rejoiced in effecting an immediate escape in a wrecking-vessel from this wild and inhospitable spot. The Indian name which it bears seems derived from some qualification of the word *Guana*, an animal of the lizard tribe, found in the holes of the rocks in, I believe, all these islands. In the cultivated parts the guanas soon disappear, as they are easily taken, and their flesh is much esteemed by the negroes.

"North-west by north, eight leagues from the south-west point of Mayaguana, lie some dangerous islets, called the *French Keys*, which I have noticed from the extreme inaccuracy with which they are laid down in most of the charts. I am not certain how far the bearing, which I have mentioned on the information of an intelligent observer, may be correct; but their actual position, it is to be hoped, will be soon made known by a gentleman* of one of the neighbouring islands, who, from taste as well as local and scientific knowledge, is likely soon to render an essential service to the world, in publishing an accurate survey of these frequented passages through the Bahama Islands.

"The winter is not the most agreeable time to navigate these seas; for although the season is not so uniformly boisterous as in the northern latitudes, and the trade-wind, with some tendency to the north, for the most part continues to blow, yet there is great inconstancy in the weather and uncertainty in the currents. I had the fortune, in the first part of my voyage, to be at sea in a good ship with able seamen; but I was surprised to find that the intricate navigation of these islands is very often undertaken by those who have never visited them before, and who, therefore, must, in a great measure, trust to charts and sailing-instructions to find their way. Such is particularly the case with the Americans: and, in consequence of their temerity, the dangerous passages are strewn with wrecks of their vessels. Nor will the most experienced, from the great variation at this season in the strength and setting of the currents, place their chief reliance on any thing but a *good look-out*, which awakens every one to personal observation.

"Having spent a restless night in partaking of the vigilance and solicitude of the pilot, and poring over our inaccurate

* "Col. Douglas, of Crooked Island."

charts, I was rejoiced at the sight of some low land, which proved to be Castle Island, about fifteen or sixteen leagues south-west from the French Keys. As the sun rose, we discovered, at no great distance, a large white rock, which appeared not unlike an old castle, and justly gave its present appellation to the key of island lying west of it. It was highly gratifying, as we came within a mile or two of the shore, to be relieved from a tossing sea; and the bright strand which surrounded Castle Island had a beautiful effect over the surface of the smooth water, which now became green as we approached the shore. It is extremely satisfactory to the mariner when some natural feature, such as the Castle-rock, can be found to denote the land; for by that circumstance alone, persons ignorant, as we were, of the general figure of the island, can distinguish it, with certainty, from some smaller islands lying to the west, and named by the Spaniards *Mira per vos*, signifying, in their language, 'take care of yourselves;' an injunction, though necessary amongst these islands in general, yet more applicable to the *French Keys*, the *Hogsties*, and *Mayaguana*."

The author then proceeded to Crooked Island, Acklin's Island, and passing by Long Island, St. Salvador, and Exuma, not far from Rum Key and Watling Island, he arrived on the Great Bank of Bahama, which is thus described.

"After passing the tropic near the islands of Great and Little Exuma, which lie stretched to leeward, or on the south-west side of Long Island and Stocking Island, from which, as from each other, they are separated only by guts or narrow channels, we stood in towards the Exuma Keys, with an intention of getting upon the white water of the Bank, as it is descriptively styled by the sailors. That immense accumulation of sand, called the Great Bahama Bank, offers a matter of curious speculation to the geological observer. Like the shores of the Bahama Islands in general, I believe it consists, in a great measure, of the relics of sea shells in the form of sand, more or less worn and rounded by the action of water. The Bank, which occupies an expanse of some hundred leagues in circumference, is bounded southerly and westerly by Cuba, and on the north-east by a broken range of innumerable little islands, called the Keys, which immediately separate it from the unfathomable sea of Exuma Sound. The water on the Bank, in this quarter, was supposed to be from fourteen to eighteen feet deep. It did not appear, from any thing I could learn, that the soundings have either increased or diminished

for many years past. At a certain depth, probably, the sand is underlaid by calcareous rocks, from the heads or fragments of it, which, in many places, on approaching the islands, appear at the bottom; and which, as you coast the Keys, require the expertness of a vigilant pilot to prevent the vessel, in a tossing sea, from striking herself against their protruded heads in the shoals, which often occur. But the light colour of the sand and the transparency of the water render the passage neither difficult nor dangerous, with a proper degree of attention.

“Through the Keys there are several cuts or passages from Exuma Sound to the Bank; and as we found a considerable swell in the deep water, and continual lightnings in the north-east, which gave us reason to apprehend an equinoctial gale, we were anxious to get upon the Bank under the lee of the Keys, with the expectation of a more smooth and secure navigation. With this view, in the afternoon of the day after passing Exuma, we steered towards a passage named *Conch Cut*, from a prodigious quantity of conch-shells which have been rolled from the Bank or adjoining shores, and thrown together near the mouth of this narrow pass. On making up to it with a fair wind, such a powerful tide set out from the Bank, that we were compelled to abandon the passage for the present. Continuing, therefore, our former course, we passed an endless succession of small islands, stretching nearly in a north-western and south-eastern line. They were covered with small trees or shrubs, and on one or two of them we discovered some traces of inhabitants. After running about a hundred miles in the same parallel, the chain of islands assumes a different inclination, forming what is termed their *elbow*, at a settlement begun by Col. Deveau, after his brilliant achievement in this quarter of the world, towards the conclusion of the American war. In tacking out on the Bank, in a short and fretful sea, a number of the dark heads of rocks were visible, at times, in the white sandy bottom, and we were obliged to avoid them by a sinuous course. Our captain, an expert and intelligent *Conch*, could judge, with admirable precision, within a few inches of the depth that his vessel would reach at every plunge: but being engaged a few minutes in examining the bearings of the distant land, and trusting, in the mean time, to the observation of a negro, we passed inadvertently over the tail of one of the rocks; and, if the helm had not been shifted, by a passenger's direction, in the twinkling of an eye, with the next wave our bottom must

have felt a severer shock than any other timber than the mahogany of Crooked Island could have well resisted. From the apparent indifference of most of the crew at this crisis, I should presume that they trust to their expertness in swimming on such occasions, like the aborigines: yet, although very near the bottom, we were at the distance of some miles from the Keys, and I confess I should have been somewhat at a loss to have found my way there without the assistance of a vessel.

"The weather proving unfavourable after we had effected the passage, we came to, and lay in a small harbour, which sheltered us from the wind, and afforded me an opportunity of examining the shore.

"One of the islands on which I landed, and which seemed to bear a characteristic resemblance in its appearance to all the rest, was composed of calcareous rock, much worn by the action of the sea, and fretted into holes like honey-combs. It was covered with silver-leaved palmettos, a dwarfish sort of mountain-cabbage, wild fig-trees, sapadillas, and many of the vegetable productions which I observed at Crooked Island, but with very little soil to invite cultivation. The animals I particularly noticed were the *mocking-birds*, which enliven the solitary shores with their own unborrowed and delightful melodies. From the holes and interstices of the rocks I frequently started lizards, which often, in complexion, seem to partake of the colour of the stone amongst which they lurk; and their full-grown brethren the guanas, being unmolested in these desert islands, appeared in great abundance; but so watchful and evasive that I found it extremely difficult to shoot them. The bay was replete with various kinds of fish, which were easily taken; some of them remarkable for the lustre and variety of their colour; such as the grunt, with azure and golden streaks on its nose, and the hynde, spotted with brilliant red, and various* others, correctly represented in the drawings of Catesby."

Having escaped this danger, Mr. M'K. reached the port of Nassau, in New-Providence. Here he acquired various agricultural, political, and juridical information, which he lays before his reader. He then relates some entertaining histori-

* "Of the fish common to the Windward Islands, the following are found here: sword-fish, king-fish, jew-fish, hog-fish, angel-fish, bill-fish, hound-fish, parrot-fish, trumpet-fish, gar-fish, bream, ten-pounder, and some others."

cal facts and anecdotes, and concludes by informing him of his own arrival at Charleston, in South-Carolina, by the route of Andros, the Berry Islands, the Biminis, Eleuthera, Harbour Islands, and Great Bahama.

ART. II. *The History of Mexico: collected from Spanish and Mexican Historians, from Manuscripts and ancient Paintings of the Indians. Illustrated by Charts and other Copper-plates. To which are added, Critical Dissertations on the Land, Animals, and Inhabitants of Mexico. By Abbe D. Francesco Saverio Clavigero. Translated from the Original Italian, by Charles Cullen, Esq. In three Volumes. 8vo. Philadelphia. Dobson. 1804.*

PERHAPS no person among us has distinguished himself so much in the republication of valuable books as the enterprising editor of the work now before us. In selecting Clavigero's History for the use of his countrymen, Mr. Dobson has shown good judgment. For every true American ought to peruse this authentic account of the ancient Mexicans, who once inhabited a country now almost bordering on the territory of the United States; and to be instructed from the Abbe C.'s learned pages to repel with energy the calumnies and falsehoods which the European *philosophers* have incessantly uttered against the western hemisphere. It is a convenience to the reader, that the octavo form of publication is substituted instead of the quarto. This will doubtless be a circumstance favourable to its general distribution; especially as the paper, type and engravings are each so good as to render it an handsome specimen of typography.

The appearance of this work pleases us the more, as it succeeds very opportunely to the information we have lately laid before our readers concerning Louisiana. We are glad to add thereto, so speedily, some account of an adjacent country of North-America, lying to the south. By seizing such opportunities as these, we shall enrich our quarterly sheets, by degrees, with a large proportion of the useful information extant concerning the two great divisions of America and the circumjacent islands. If we should be favoured with the means of accomplishing this design, we shall incorporate into the Medical Repository almost every thing lying within the limits of our plan that the new world affords. And by per-

severance in this procedure, it will become one of the great magazines of American intelligence.

Clavigero, the author of this History, was an American by birth. His place of nativity was Vera-Cruz. He resided thirty-six years in the country which he describes. He was not only well versed in the modern and learned languages taught in Europe, but also in the tongue of the people whose history he has written. He conversed with the natives, studied their historical paintings, and perused their manuscripts. He likewise read the books written by the Europeans, inquired into their genuineness, weighed their authorities and evidence, and compared them with each other. With such opportunities, and with leisure, favour and fortune sufficient for the undertaking, he composed an elaborate performance, which, while it preserves from oblivion the memory of a remarkable race of men now extinct, rescues also from numberless reproaches the surviving inhabitants of this quarter of the globe. To the natural and civil history of Mexico are added several dissertations, in which the ignorance of Gage, De Pauw, Robertson, Raynal, and others, are most glaringly exhibited, and their illiberal misrepresentations and perversions refuted great ability.

After a short preface by the translator, and another by the author, the first volume opens with a catalogue of the writers on the ancient history of Mexico which appeared in the 16th, 17th, and 18th centuries. This is a circumstantial and critical list of the various books written on the subject, followed by an enumeration of the five great collections of Mexican paintings, to wit, that of Mendoza at London, of the Vatican at Rome, of Emanuel at Vienna, of Siguenza in the Jesuit's College of St. Peter and Paul at Mexico, and of Boturini in the archives of the viceroy at the same place.

The author has distributed the materials of his work into ten books. Of these, the first is devoted to the description of the country of Anahuac, in regard to its soil, climate, mountains, rivers, lakes, minerals, plants, animals, and people; and comes fairly within our province as reviewers. The nine following books treat chiefly of the civil history of the nations which inhabited Anahuac before the Aztecas from the region of Atzlan, situated 2700 miles to the north-west, on the Gulf of California, where they originally dwelt, migrated, about the year 1160, to Mexico, and laid the foundation of their power. Their wars, servitude, succession of their kings, their conquests, religious system, gods, idolatry, temples, sacrifices

of human beings, divination, festivals, and natal, nuptial, and funereal rites, are particularly described. Their plan of education, the coronation-ceremonies and prerogatives of the crown, a sketch of their civil and military laws, their fortifications, arts, commerce, manufactures, medicine, food, clothing, and furniture, are delineated at considerable length. Then the arrival of the Spaniards is told. The armament, voyage, landing and proceedings of Cortez are narrated, with all their circumstances, up to the entry of the invaders into Mexico, and the imprisonment and death of Montezuma; as are likewise the subsequent events before and during the siege, and at the final assault and capture of that ill-fated city, in the month of August, 1521.

At the end of the first volume is an appendix, replete with curious information on the calendar of the Mexicans, and their manner of computing time, with an explanation of some of the obscure Mexican symbols. And the greater part of the third is made up of nine learned dissertations on the country, its animal productions, and the condition, civilization and improvement of the human species. In these the American character, in respect to soil, atmosphere, living creatures, and particularly man, is vindicated with remarkable force and success. Mr. C.'s knowledge so far transcends that of the pseudo-philosophers of Europe, who have, almost ever since its discovery, reviled America and every thing belonging to it, that if they were alive they must feel confounded at the exhibition he makes of their absurdities. As the most able and zealous advocate of the fame and honour of his native land, Clavigero deserves the respect of every independent American; and the history, and more especially the dissertations which accompany it, merit his careful perusal.

But our readers are impatient for a quotation from the work itself. We therefore extract for their gratification Mr. C.'s description of the lake and climate of Mexico, from page 13 of the first book.

"There were besides, and still are, several lakes, which did not less embellish the country than give convenience to the commerce of those people. The lake of Nicaragua, of Chapallan, and Pazquaro, which were the most considerable, did not belong to the Mexican empire. Amongst the others, the most important to our history are those two in the vale of Mexico, which we have already spoken of. The lake of Chalco extended twelve miles from east to west, as far as the city of Xochimilco, and from thence taking, for as many

miles, a northerly direction, incorporated itself, by means of a canal, with the lake of Tetzcuco; but its breadth did not exceed six miles.

"The lake of Tetzcuco extended fifteen miles, or rather seventeen from east to west, and something more from south to north; but at present its extent is much less, for the Spaniards have diverted into new channels many rivers which formerly ran into it. All the water which assembles there is at first sweet, and becomes salt afterwards, from the nitrous bed of the lake where it is received.* Besides these two great lakes, there were, in the same vale of Mexico, and to the north of the coast, two smaller ones, named after the cities of Tzompanco and Xaltocan. The lake of Tochtlan, in the province of Coatzacualco, makes a sweet prospect, and its banks a most delightful dwelling. With respect to fountains, there are so many in that land, and so different in quality, they would deserve a separate history, especially if we had to enumerate those of the kingdom of Michuacan. There are an infinity of nitrous, sulphureous, vitriolic, and alluminous mineral waters, some of which spring out so hot, that in a few moments any kind of fruit or animal food is boiled in them. There are also petrifying waters, namely, those of Tehuacan, a city about one hundred and twenty miles distant from Mexico towards the south-east, those of the spring of Pucuario in the states of the Conte di Miravalles, in the kingdom of Michuacan, and that of a river in the province of Queleni. With the water of Pucuario they make little white smooth stones, not displeasing to the taste; scrapings from which, taken in broth, or in Atolli,† are most powerful diaphoretics, and are used with remarkable success in various kinds of fevers.‡ The

* "M. de Bomare says, in his Dictionary of Natural History, that the salt of the Mexican lake may proceed from the waters of the ocean in the north being filtered through the earth; and to corroborate his opinion he quotes *Le Journal des Scavans*, of the year 1676. But this is truly a gross error, because that lake is one hundred and eighty miles distant from the ocean; besides, the bed of this lake is so elevated, that it has at least one mile of perpendicular height above the level of the sea. The anonymous author of the work entitled, *Observations curieuses sur le Lac de Mexique*, (the work expressly from which the journalists of Paris have made their extracts) is very far from adopting the error of M. de Bomare."

† "Atolli is a name given by the Mexicans to a gruel made of maize or Indian corn."

‡ "The little stones of Pucuario have been known but a short time. I have myself been an eye-witness of their wonderful effect in the epidemic of 1762. The dose prescribed for one who is easily brought to sweat is one drachm of the scrapings."

citizens of Mexico, during the time of their kings, supplied themselves with water from the great spring of Chapoltepec, which was conveyed to the city by an aqueduct, of which we shall speak hereafter. In mentioning the waters of that kingdom, if the plan of our history would permit, we might describe the stupendous falls or cascades of several rivers,* and the bridges which nature has formed over others, particularly the *Ponte di Dio*. Thus they call, in that country, a vast volume of earth thrown across the deep river Atoyaque, close to the village of Molcaxac, about one hundred miles to the south-east from Mexico, along which coaches and carriages conveniently pass. It is probable it has been a fragment of a neighbouring mountain, thrown from it by some former earthquake.

“The climate of the countries of Anahuac varies according to their situation. The maritime countries are hot, and, for the most part, moist and unhealthy. Their heat, which occasions sweat even in January, is owing to the perfect flatness of the coasts compared with the inland country; or from the mountains of sand that gather upon the shore, which is the case with Vera Cruz, my native country. The moisture proceeds not less from the sea than from the abundance of waters descending from the mountains which command the coast. In hot countries there is never any white frost, and most inhabitants of such regions have no other idea of snow than that which they receive from the reading of books, or the accounts of strangers. Lands which are very high, or very near to very high mountains, which are perpetually covered with snow, are cold; and I have been upon a mountain, not more than twenty-five miles removed from the capital, where there has been white frost and ice even in the dog-days. All the other inland countries, where the greatest population prevailed, enjoy a climate so mild and benign, they neither feel the rigour of winter nor the heats of summer. It is true, in many of these countries there is frequently white frost in the three months of December, January, and February, and sometimes even it snows; but the small inconvenience which such cold occasions, continues only till the rising sun: no other fire than his rays is necessary to give warmth in winter; no other relief is wanted, in the season of heat, but the shade; the same

* “Amongst the cascades there is one famous, made by the great river Guadalaxara, in a place called Tempizque, fifteen miles to the southward of that city.”

clothing which covers men in the dog-days defends them in January; and the animals sleep all the year under the open sky.

"This mildness and agreeableness of climate under the torrid zone is the effect of several natural causes, entirely unknown to the ancients, who believed it uninhabitable; and not well understood by some moderns, by whom it is esteemed unfavourable to those who live in it. The purity of the atmosphere, the smaller obliquity of the solar rays, and the longer stay of this luminary upon the horizon in winter, in comparison of other regions farther removed from the equator, concur to lessen the cold, and to prevent all that horror which disfigures the face of nature in other climes. During that season, a serene sky, and the natural delights of the country, are enjoyed; whereas, under the frigid, and even, for the most part, under the temperate zones, the clouds rob man of the prospect of heaven, and the snow buries the beautiful productions of the earth. No less causes combine to temper the heat of summer. The plentiful showers which frequently water the earth after mid-day, from April or May to September or October; the high mountains continually loaded with snow, scattered here and there through the country of Anahuac; the cool winds which breathe from them in that season; and the shorter stay of the sun upon the horizon, compared with the circumstances of the temperate zone, transform the summer of those happy countries into a cool and cheerful spring.

"But the agreeableness of the climate is counterbalanced by thunder-storms, which are frequent in summer, particularly in the vicinity of Matlalcueje or the mountain of Tlascala, and by earthquakes, which at all times are felt, although with less danger than terror. These first and last effects are occasioned by the sulphur and other combustible materials deposited in great abundance in the bowels of the earth. Storms of hail are neither more frequent nor more severe than in Europe.

"The fire, kindled in the bowels of the earth by the sulphureous and bituminous materials, has made vents for itself in some of the mountains or volcanos, from whence flames are often seen to issue, and ashes and smoke. There are five mountains in the district of the Mexican empire, where, at different times, this dreadful phenomenon has been observed. *Pojauhtecatl*, called by the Spaniards *Volcan d'Orizaba*, began to send forth smoke in the year 1545, and continued to do so for twenty years: but after that, for the space of more

than two centuries, there has not been observed the smallest sign of burning. This celebrated mountain, which is of a conical figure, is indisputably the highest land of all Anahuac; and, on account of its height, is the first land descried by seamen who are steering that way, at the distance of fifty leagues.* Its top is always covered with snow, and its border adorned with large cedar, pine, and other trees of valuable wood, which make the prospect of it every way beautiful. It is distant from the capital upwards of ninety miles to the eastward.

"The *Popocatepec* and *Iztaccihuatl*, which lay near each other, but thirty-three miles distant from Mexico towards the south-east, are also of a surprising height. *Popocatepec*, for which they have substituted the name of *Volcan*, has a mouth or vent more than half a mile wide, from which, in the time of the Mexican kings, it frequently emitted flames; and, in the last century, many times threw out great quantities of ashes upon the places adjacent; but in this century hardly any smoke has been observed. *Iztaccihuatl*, known by the Spaniards under the name of *Sierra Nevada*, threw out also, at some times, smoke and ashes. Both mountains have their tops always covered with snow, in so great quantities as to supply, with what precipitates on the neighbouring rocks, the cities of Mexico, *Gelopoli*, *Cholula*, and other adjoining places, to the distance of forty miles from these mountains, where an incredible quantity is yearly consumed in cooling and congealing liquors.†

"The mountains of *Coliman* and *Tochtlan*, considerably distant from the capital, and still more so from each other, have emitted fire at different periods in our time.‡

* "*Pojaubtecatl* is higher than *Taide* or the Peak of *Teneriffe*, according to P. Tallandier the Jesuit, who made observations on them both. (*Vide Lettres Edifiantes, &c.*) Thomas Gage says of the *Popocatepec*, it is as high as the highest Alps: he might have added, something higher, if he had calculated the elevated station on which this celebrated mountain rises."

† "The impost or duty upon ice or congealed snow consumed in the capital, amounted, in 1746, to 15,522 Mexican crowns: some years after it rose to 20,000, and at present we may believe it is a great deal more."

‡ "A few years ago an account was published in Italy, concerning the mountains of *Tochtlan* or *Tustla*, full of curious, but too ridiculous lies; in which there was a description of rivers of fire, of frightful elephants, &c. We do not mention, among the burning mountains, neither *Juruya* nor *Mamotombo*, of *Nicaragua*, nor that of *Guatemala*, because neither of these three was comprehended under the Mexican dominions. That of *Guatemala* laid in ruins with earthquakes that great and beautiful city, the

" Besides these mountains there are likewise others, which, though not burning mountains, are yet of great celebrity for their height; namely, Matlalcueye, or the mountain of Tlascalala; *Nappateuctli*, called by the Spaniards, from its figure, *Cofre*, or Trunk; *Tentzon*, near to the village of Moacaxac, Toloacan, and others, which, being of no importance to the subject, I intentionally omit. Every one knows that the famous chain of the Andes, or Alps of South-America, are continued through the isthmus of Panama, and through all New Spain, till they lose themselves in the unknown countries of the north. The most considerable part of this chain is known in that kingdom under the name of *Sierra Madre*, particularly in Cinaloa and Tarahumara, provinces twelve hundred miles distant from the capital.

" The mountains of Anahuac abound in ores of every kind of metal, and an infinite variety of other fossils. The Mexicans found gold in the countries of the Coahuixcas, the Mixtecas, the Zapotecas, and in several others. They gathered this precious metal chiefly in grains amongst the sand of the rivers, and the above-mentioned people paid a certain quantity in tribute to the crown of Mexico. Silver was dug out of the mines of Tlachco, Tzompanco, and others; but it was not so much prized by them as it is by other nations. Since the conquest, so many silver mines have been discovered in that country, especially in the provinces which are to the northwest of the capital, it is quite impossible to enumerate them. Of copper they had two sorts; one hard, which they used instead of iron to make axes, hatchets, mattocks, and other instruments of war and agriculture; the other flexible, for making of basons, pots, and other vessels. This metal abounded

29th of July, 1773. With respect to Juruyo, situated in the valley of Urecho, in the kingdom of Michuacan, before the year 1760 there was nothing of it but a small hill, where there was a sugar plantation. But on the 29th of September, 1760, it burst with furious shocks, and entirely ruined the sugar work, and the neighbouring village of *Guacana*; and from that time has continued to emit fire and burning rocks, which have formed themselves into three high mountains, whose circumference was nearly six miles, in 1766, according to the account communicated to me by Don Emmanuelle di Bustamante, Governor of that province, and an eye-witness of the fact. The ashes, at the eruption, were forced as far as the city of Queretaro, one hundred and fifty miles distant from Juruyo, a matter almost incredible, but public and notorious in that city; where a gentleman showed me, in a paper, the ashes which he had gathered. In the city of Valladolid, sixty miles distant, it rained ashes in such abundance, they were obliged to sweep the yards of the houses two or three times during the day."

formerly, more than elsewhere, in the provinces of Zacatollan and the Coahuixcas; at present it abounds in the kingdom of Michuacan.

“ They dug tin from the mines of Tlachco, and lead from the mines of *Izmiquilpan*, a place in the country of the Otomies. Of tin they made money, as we shall observe in its place, and we know of lead that it was sold at market, but we are entirely ignorant of the use it was put to: there were likewise mines of iron in Tlascala, in Tlachco, and other places; but they either did not find out these mines, or, at least, did not know how to benefit themselves by the discovery. There were also in Chilipan mines of quicksilver, and in many places mines of sulphur, alum, vitriol, cinnabar, ochre, and a white earth strongly resembling white lead. Of quicksilver and vitriol we do not know the use which they made: the other minerals were employed in painting and dyeing. Of amber and asphaltum, or bitumen of Judea, there was, and still is, great abundance on both coasts, and they were both paid in tribute to the king of Mexico from many places of the empire. Amber they used to set in gold for ornament; asphaltum was employed in certain incense offerings, as we shall find hereafter.

“ With respect to precious stones, there were, and still are, diamonds, though few in number; amethysts, cats-eyes, turquoises, cornelians, and some green stones resembling emeralds, and not much inferior to them; and of all these stones, the Mixtecas, the Zapotecas, and Coahuixcas, in whose mountains they were found, paid a tribute to the king. Of their plenty and estimation with the Mexicans, and the manner in which they wrought them, we shall speak more properly in another place. The mountains which lay on the coast of the Gulf of Mexico, between the port of Vera Cruz and the river Coat-zacualco, namely, those of Chinantla, and the province of Mixtecas, furnished them with crystal; and the cities of Tochtepec, Cuetlachtlan, Cozamaloapan, and others, were obliged to contribute annually to the luxury of the court.”

But it being impossible to do justice to this important publication in the present number, we must postpone the further consideration of it until our next.

(To be continued.)

ART. III. *Transactions of the American Philosophical Society, held at Philadelphia, &c.*

[Continued from p. 172, and concluded.]

HAVING already analysed the contents of this volume, as far as they related to Customs, Meteorology, Mathematics, and Chemistry, we proceed to the articles contained in the

Vth division, which comprehends *the papers on Zoology*. These are three in number. One of them is a *Description of two species of sphex inhabiting Virginia and Pennsylvania, and probably extending through the United States*. By Benjamin H. Latrobe. This is a minute and circumstantial history of two insects, called the blue-wasp, mud-wasp, and dirt-dauber. The memoir is illustrated by drawings of the animals and their clay-built habitations. The remarkable function of these creatures is, to catch spiders, and keep them imprisoned, in a benumbed and torpid condition, a considerable duration of time, to afford aliment to their growing progeny. We have repeatedly examined the nests of these courageous and warlike sphexes, and found them well stored with spiders of various species, crammed and packed together in such a manner as to exhibit mostly faint signs of life, but withal so oddly disabled as neither to die very soon or ever to recover. They are common in New-York, and construct their earthy cells in the piazzas and chambers of houses. We can bear witness to the general accuracy of Mr. Latrobe, in his observations upon these formidable enemies of the spider-family.

Another zoological memoir is by Dr. Barton, on an amphibious animal not heretofore described. It is a species of *lacerta*, which he calls *subviolacea*, and describes in the following words: (p. 110.) "*Lacerta subviolacea; cauda compressa, mediocri; corpore subviolaceo, glabro, viscido, poroso; maculis flavis cinereisque vario; palmis tetradactylis, plantis pendactylis, omnibus muticis.*"

A third communication belonging to this head is by the same writer, who has proved satisfactorily that the little quadruped called jerboa, or *dipus Americanus*, actually grows torpid, or goes occasionally into the hybernating state, in the neighbourhood of Philadelphia, on the approach of winter. The account is short, and is a supplement to the paper noticed in our Hex. I. vol. iv. p. 180.

VI. Botany furnishes but one paper to the volume. This

is written by Professor Barton, on a new species of vegetable *muscipula*. Having collected, during the summer of 1801, some branches, in blossom, of the Syrian swallow-wort, or *Asclepias Syriaca*, he found that the valves of the flowers possessed irritability enough to close upon the common house-flies which alighted on them, and to catch some of them by the rostrum and some by the legs. The trap sometimes sprung so feebly that the flies could draw out their members entire; it sometimes held them so firmly that they could only escape by leaving a limb behind; while others, who could neither extract their legs, &c. nor drop them, struggled till they were exhausted, and finally expired in their vegetable stocks.

VII. There are two papers on geological subjects.

1. In the first of these (p. 55), Mr. Martin Duralde relates, that in the country of Opelousas, west of the Mississippi, there have been found animal bones at considerable depths under ground. An human skull, an Indian bowl, and some sound oyster-shells, were found from twenty-two to thirty-five feet below the surface. Huge elephantine bones, evidently of the mammoth, have been discovered in several places, but not so profoundly buried.

2. The second is a very interesting *Description of the river Mississippi and its Delta, with that of the adjacent parts of Louisiana*. By Mr. William Dunbar.—We consider an extract from this elaborate performance (p. 165) preferable to any abstract of our own.

“The multiplicity of the rivers which are tributary to the Mississippi, extending themselves over an immense tract, which comprehends nearly 20 deg. in lat. and 30 in long. must render this river, at all seasons, one of the most considerable on the globe. The annual inundation, being supplied from so great a variety of climates, must naturally be expected to be of long duration; and may generally be estimated at nearly half the year; beginning (com. annis) to rise in January, and fall in June; the two extremes being frequently extended by the early autumnal and winter rains in the southern latitudes, and by the protraction of the northern winters, which retards the dissolution of the immense accumulations of snow in those cold regions. At the landing of the Natchez (380 miles from the mouth of the river) the perpendicular ascent of the waters of the Mississippi, from the lowest ebb to the highest inundation, may be estimated at 50 feet. At Baton Rouge (200 miles distant) it was found to be 30 feet; at New-Orleans (80 miles above the mouth) it is about 12 feet; and at the mouth of

the river scarcely any perceptible change is observed, excepting by a stronger current, charged with earthy matter, rolling into the ocean during the season of the inundation; at which time all the lakes and communications with the sea are replenished with the waters of the inundation, and the ocean itself is often repelled to such a degree, that fresh water has been drawn up out of sight of land. This great difference in the perpendicular rise of the waters of the inundation is to be accounted for from the prodigious number of natural canals issuing from the Mississippi, and those immense sheets of water, often unbounded by a single horizon, flowing over the banks, never to return, and inundating vast tracts of country, which owe their existence to the creative power of this grand river, and which finally discharge themselves into the Mexican Gulf by an infinite number of mouths, many of which are, in apparent magnitude, equal to the Mississippi itself; the space embraced by the Delta of this river, on the sea coast, being, from information, not less than three degrees of longitude.

“The waters of the Mississippi are not, at any time, perfectly transparent: during the absence of the inundation they are not much troubled, presenting a slight milky appearance, which is attributed to the Missouri; but during the time of the inundation, all the rivers which discharge their superabundant waters into the Mississippi are more or less charged with terrene matter, and during the decline of the inundation the turbidness is sometimes so great that a glass filled with its water appears to deposit, in a few minutes, a sediment equal to one-eighth of its bulk. This extreme impurity is not to be attributed entirely to the immediate effect of the Missouri, but principally to the falling in of the mud banks, either newly formed beneath the influence of the current of the river, or undermined by its rapidity, perpetually changing its bed, by enlarging the concavity of its bends, and projecting its points or head-lands. This operation has a natural tendency to lengthen the circuitous course of the river; but the effect is amply compensated by its own progress; for the enlargement of the bends frequently brings them so near each other, that the weight of the waters bursts at once through the solid soil, forming, in a few days, a new bed, capable of conveying the whole waters of this mighty river, and shortening thereby its course many leagues. The disruption which took place at Point Coupée cut off ten leagues, and within this territory the cut-off at the Homochito has thrown to the east of the Mis-

Mississippi an island of seven leagues in circuit; and at the Yazooz a similar effect has been produced on the west side, by the formation of an island of five leagues in circumference. Those islands are now both converted into peninsulas, by the formation of new land across one of the mouths of the old channel, while the other is partially kept open by the discharge of the (comparatively) small rivers of the Yazooz and Homochito; the former of those, nevertheless, is not inferior in magnitude to that great commercial river the Thames. The consequence of those disruptions is the formation of lakes, which, in process of time, may be far removed from the actual channel of the river, and, in effect, are now found to be scattered in all situations over the immense valley of the Mississippi.

“When those lakes are first approached, they present so perfect a resemblance of the Mississippi, with regard to breadth, the appearance of the banks, and the natural serpentine form of its course, that many persons have been deceived thereby, and recognized their error only by the discovery of the stagnant state of the water, the appearance on its borders of the *Nymphæa Nelumbo*, and other aquatic plants. No person, therefore, doubts that those lakes have all, in their turn, served to convey the waters of this father of rivers, and now, during the season of the inundation, still flow with a full current, contributing their aid to the evacuation of the waters of a thousand rivers which precipitate themselves into the valley of the Mississippi. When we take a survey of this valley, upwards of thirty miles wide opposite to the Natchez, diverging very obtusely as we approach the sea-coast, where it is, perhaps, not less than three degrees in longitude, and that in no part of it do we discover any other soil than such as is now daily deposited by the waters of the Mississippi, it is impossible not to believe that this valley has, in the beginning, been a branch or inlet of the ocean, which received into its bosom this great river, similar to the River de la Plata, the Gulf of St. Lawrence, Delaware Bay, and many others not remarkable for the alluvial properties of their rivers. When, on the other hand, we contemplate the effects of the creative power of the Mississippi, which has filled up this prodigious space with soil, more or less solid, and which must, at Natchez, exceed 100 feet perpendicular above the level of the sea, sloping gradually, like an immense glacis, to the coast of the Bay of Mexico, where, nevertheless, it does not terminate, but shelving off, by continual accumulation, frequently embarrasses

vessels out of sight of land, along the coast, to the west of the Mississippi: I say, when we survey this immense work, performed by the hand of nature, we cannot accord with the opinions of certain visionary philosophers, who have been pleased to amuse themselves with the pretended infantile state of our continent, compared to their transatlantic world; but, on the contrary, we must grant to it an incalculable antiquity. When the inundation is at its height, the whole valley is replenished with water, every where in motion, making its progress towards the ocean; so that, at that season, the river may be said to be thirty miles or more in breadth at Natchez. The waters which pass over the west bank of the main channel never return. On the east, a chain of high land, which, at many points, is washed by the river, meandering along its valley, compels its waters to rejoin the primitive stream; but from Baton Rouge, the high land, which has hitherto held a southerly course, diverges suddenly to south-east, and is no more visited by the grand channel of the Mississippi. All the waters which escape to the eastward, between Baton Rouge and Manshac, (fifteen miles) are collected by the Iberville, which, passing through a breach in the high land of about sixty yards wide, delivers its contents to the river Amit, which empties itself into lake Maurepas, communicating with the ocean by the intervention of the more considerable lake Ponchartrain. The high land is continued in a very narrow tongue or promontory, in a south-easterly direction, along the island of New-Orleans, which is disrupted in many places, thereby venting the waters of the inundation into the lakes, which otherwise would be collected into an oblong bason, formed by the high land on the one hand, and the bank of the river on the other. One half of the island of New-Orleans would have thereby become so completely inundated as to be uninhabitable.

“The perpendicular height of the high lands above the level of the inundation is from 200 to 300 feet at Natchez; at Baton Rouge it does not exceed 25; and on the island of New-Orleans it declines so rapidly as frequently to be lost under the accumulations of soil deposited by the waters of the inundation. In the sides of a canal from New-Orleans to the river St. John's, communicating with lake Ponchartrain, I discovered the continuation of the high land cut through to the breadth of little more than 20 feet.

“To a stranger, the first view of the Mississippi conveys not that idea of grandeur which he may have pictured to him-

self: his first judgment will rest upon the appearance of its breadth, in which respect it is inferior to many rivers of much less note. Its principal channel is rarely a mile in width any where below the Ohio, unless where its stream is divided by islands or shallows: it is not unfrequently less than half a mile. The magnitude of this river is not to be computed by its width, but by its depth; in which it is, perhaps, equal to any on the globe; but is so contracted at the place of its entrance into the ocean, as to be there less in width than it is found to be at a thousand miles from its mouth: the cause of this peculiarity is, perhaps, not difficult to develope. The natural effect of rivers is to increase continually the depth and breadth of their beds, by the perpetual abrasion of their waters. Such must be the consequence with regard to all rivers which do not supply by alluvion a sufficient quantity of matter to counteract this effect. Certain rivers, which, in the upper part of their course, pass through fertile regions, whose rich and tender soil is easily broken down and carried away by the impetuosity of the current, not only supply this deficiency, but discharge such inconceivable quantities of earthy matter as to fill up, in a great measure, those spacious bays and channels, scooped out by the hand of nature, in order to facilitate the mingling of their waters with those of the ocean. In such circumstances the breadth of the river will always be in proportion to the mean quantity of water discharged during the time it flows within its banks: for it is to be remarked, that during the time of the inundation the common channel of the river is in some measure lost in the immensity of waters which flow over its banks in all directions. The bottom and sides of the channel, during this time, suffer no abrasion, but, on the contrary, from the diminution of the velocity of the inferior currents, gain rapidly upon the breadth of the river. The moment the current of the river is confined within its proper banks, it begins to exert its dominion over its own channel, and fashions its bed by the momentum of its waters, attacking sometimes one side, sometimes the other, according as the main filament of the stream is deflected from shore to shore; by which means large portions of the newly-created soil are preserved, while in other situations the more compact earth is undermined and borne into the ocean, and thus an equilibrium is restored between the channel and its included waters. Hence it comes to pass that rivers which run through alluvial countries are much narrower, in proportion to the quantity of their waters, than those whose courses are over rocks, gravel or sand; but,

On the other hand, their depths are great, and they are consequently better fitted for the purposes of navigation. The Mississippi is supposed to be navigable (pursuing the western branch, or Missouri,) 3000 miles at least from the ocean. Those who have studied the theory of rivers inform us, that the stability of the bed of a river depends upon a due equilibrium between the velocity of the current and the tenacity of those matters which compose its bottom and sides. The velocity of rivers is greatest at the surface, gradually diminishing downwards. Hence, when the bottom is composed of matter of the most yielding nature, the channel will continue to deepen until the velocity at bottom is almost nothing, and the depth of the water will be regulated by those circumstances. The bottom of the bed of the Mississippi, within the alluvial country, being composed of the finest sand and lightest earth extremely comminuted, it is not surprising that its depth should be comparatively great. Its soundings have, it is believed, never been taken with minute attention; but from New-Orleans to the mouth of the river, its depth is said to be from fifty to seventy fathoms, under the thread of the current, which follows the concave shore; diminishing gradually towards the elbows, where there are frequently considerable shallows. The sudden effect of the diminution of the velocity of water is nowhere more remarkable than at the mouth of this river; for the rolling torrent no sooner arrives at the ocean, than, finding its bed indefinitely enlarged, it spreads on all hands; the thread of the current diverges into an infinite number of filaments, like radii from a centre; the velocity of the mass of water rapidly diminishes until, no longer able to propel the matter hitherto suspended and swept along by the swiftness of the stream, it is deposited in form of a crescent, opposing to the mouth of the river a bar, with from twelve to twenty feet water. The current being less, immediately to the right and left than in front of the mouth of the river, the deposition and accumulation of matter will consequently proceed more rapidly on either side; and the velocity of the current being increased by the contraction of the channel, the bar will be protruded further into the ocean. Hence it appears why the mouths of all alluvial rivers terminate in a promontory projecting more or less into the ocean. This last mentioned operation of nature points out the method of improving the navigation of the entrance of the Mississippi, which may be effected at no very considerable expense, by carrying out a pier on each side of the principal branch, composed of piles, so far

as may be found sufficient to procure the desired depth. The bar will thereby be thrown into deeper water, and, in process of time, will accumulate and ascend to its former height, which will demand a new prolongation of the piers. Every small rivulet passing through Lower Louisiana is a miniature of the Mississippi: what may be performed, upon a small scale, in respect to the latter, will certainly succeed (by well directed efforts) on the former. The river St. John's, sixty to eighty feet wide, entering lake Ponchartrain to the north of New-Orleans, was found frequently so choaked up and impeded by a bar across its mouth, that canoes could sometimes with difficulty enter; sloops and batteaux being obliged, at such times, to remain in the lake, exposed to danger. The government directed two very simple piers, each composed of a double row of round rough piles, to be carried from the shore across the bar; and although the piers were pervious to the water, yet so much velocity was acquired, that the bar was very speedily swept off, and the river has always since remained navigable for small sloops and schooners, which proceed up to the city by the river and canal of Carondelet.

"The depth of the river diminishes considerably as we advance upwards; probably owing to the increased tenacity of the matter forming its bed. At Natchez, when the waters are low, it is about twelve fathoms; and there are situations below the Ohio, where the ordinary boats have been embarrassed to find a passage both upwards and downwards: a moderate fresh, nevertheless, renders the Mississippi navigable up to the Falls of St. Anthony, about 2000 miles from its mouth. The breadth of the river appears to be upon the increase upwards, in proportion as we get above the alluvial country, as high as the Missouri, notwithstanding the loss of a number of principal rivers which flow in below. In latitude 42 deg. it is said to be half a mile in breadth, which probably equals its mean breadth from Yazooz to its mouth.

"The margin of the river is the highest land to be found in the valley of the Mississippi. As the river overflows its banks, the waters immediately begin to deposit their grossest particles, which are chiefly sand and black marl; and in their progress backwards, this deposition is continued until, at length, a matter is deposited, so highly levigated that, upon the retiring of the waters, it assumes a compactness and solidity resembling pitch. When the river, by disruption, alters its course, and new accumulations of slime, sand and marl are laid upon this very compact earth, a false belief might be in-

duced that this solid soil is not the offspring of the river, but the original parent earth coeval with the Mississippi itself, upon which this great river had afterwards deposited the rich spoils of the northern regions, borne down by its mighty tide. This compact soil I have found at the depth of from ten to thirty feet; and in other situations no appearance is to be seen of any other than the common soil formed of the mud of the river. The soil near the river is sandy, particularly that which has been lately formed. From a quarter to half a mile from the margin of the river the sand is less apparent, and it loses its name of '*terre sablonneuse*,' acquiring that of '*terre grasse*,' being the richest black marl, with a moderate admixture of sand. At greater distances, and frequently at some depth under the last mentioned soils, is found the above mentioned compact earth, called *glaise* (potter's earth): it is no doubt eminently adapted to the use of the potter, though hitherto not much applied to the manufacture of earthen ware. Upon all lands long subject to culture, and defended from the inundation, although near to the margin, the appearance of sand is almost lost; but it is evident, from the friability of the soil, and the facility with which it is cultivated, that a large portion still remains intimately mixed with it; whereas the *terre grasse* (unmixed or pure marl) yields with difficulty to the plough: it exhibits proofs of the richest marl, a slight shower causing it to crumble into powder after being turned up: yet, as our climate is exposed to sudden and violent falls of rain, with hot sun-shine, it frequently becomes so firm and unyielding, after the crop has been planted, that no mode of cultivation can be conveniently applied, but barely scratching the surface with the hoe; yet this became, with the French indigo planters, a favourite soil. Although less productive, it is more easily kept clear of weeds, the compacted soil refusing a passage to their tender fibrous roots, while the vigorous tap-root of the indigo plant conquers the obstinacy of the subjacent stratum. From the river bank a natural glacis is formed, whose declivity at New-Orleans may be at the rate of six or eight inches in 100 feet, to the distance of 600 or 700 toises, diminishing; after which the descent becomes almost imperceptible, and is gradually lost in swamps, marshes and lakes, which finally communicate with the sea."

Mr. Dunbar has drawn a striking parallel between this copious river of North-America and the famous stream which runs through Egypt. But after presenting so long a quotation, we find ourselves constrained to pass over the lively

comparison which the author has made between the Mississippi and the Nile. It strikes us there is an analogy with the Ganges. We refer our readers to the memoir itself: and hope Mr. D. will devote further portions of his time to the prosecution of this curious subject.

VIII. Under the head of what may be termed *Natural History*, as distinguished from the preceding denominations, we find four essays.

1. On the controverted question of the hybernation of swallows, Col. Antes declares, that in Philadelphia county, during the month of February, he took the torpid body of a swallow from a pond filled with mud and leaves. He washed off the mud, and put it into his pocket. He went home some hours after, and applied to it the gentle warmth of a stove. He saw the bird revive, fly about the room, catch flies, and alight, from time to time, on the furniture. It lived until the swallows arrived in the natural course of the season, and was then kindly dismissed to join them.—For a variety of information on this disputed point, see our Hex. I. vol. ii. p. 178, vol. iii. p. 241, and vol. iv. p. 215.

2. Dr. John Watkins has written *A letter containing some notices of the northerly parts of Louisiana*. It contains miscellaneous remarks on the plants and animals of that region.

3. Mr. Thomas has given *An account of some newly-discovered islands and shoals, which lie in the usual course of ships to and from China*, if they sail round New-Holland, and return by the eastern passage. He has carefully ascertained the latitude and longitude of each.

4. *Observations and experiments* (p. 129) relating to equivocal or spontaneous generation. By J. Priestley, LL. D. &c. This is intended as a reply and refutation of the self-producing and spontaneously-vital properties of matter, taught by Dr. Darwin, in his philosophical poem, *The Temple of Nature*. He denies the conclusions which had been made by that writer, from the formation of his *green matter*, (*conferva fontinalis*) as in any degree favouring that hypothesis. He explains the facts, or pretended facts, adduced by Dr. Darwin, in such a way as to favour the doctrine of seeds and germs, and of the origin of organized beings from parents or prototypes. Dr. Priestley then inveighs against the tendency to atheism of this alledged power of *spontaneous* production in nature, and contends that there are, at this moment, as many marks of *design* in the creation, and of a *Designing Cause*, as ever there were; and these, he conceives, are most completely manifested in the

appetencies and powers of attraction with which Dr. Darwin endows matter, and in their nisus to form organic bodies. The doctrine maintained in the *Temple of Nature*, Dr. P. concludes to be unphilosophical and impious, and therefore deserving of rejection by every rational mind.

IX. Two articles are employed on improvements in the *Mechanic Arts*.

The Society of Rotterdam having asked of the Society of Philadelphia, *Whether any improvements had been made in the construction of steam-engines in America, and what those improvements were?* the subject was referred to that celebrated engineer, Mr. Benjamin H. Latrobe, to consider and report upon. In obedience to the Society's commands, Mr. L. has presented his *first* report. It contains a very exact and instructive history of the steam-engine in this country. The remarks which he makes on the employment of that machine to propel boats through the water, are so judicious and seasonable that we copy them. (P. 90.)

“During the general lassitude of mechanical exertion which succeeded the American revolution, the utility of steam-engines appears to have been forgotten; but the subject afterwards started into very general notice, in a form in which it could not possibly be attended with much success. A sort of mania began to prevail, which, indeed, has not yet entirely subsided, for impelling boats by steam-engines. Dr. Franklin proposed to force forward the boat by the immediate action of steam upon the water. (See his Works.) Many attempts to simplify the working of the engine, and more to employ a means of dispensing with the beam, in converting the libratory into a rotatory motion, were made. For a short time a passage-boat, rowed by a steam-engine, was established between Bordentown and Philadelphia; but it was soon laid aside. The best and most powerful steam-engine which has been employed for this purpose, excepting, perhaps, one constructed by Dr. Kinsey, with the performance of which I am not sufficiently acquainted, belonged to a few gentlemen of New-York. It was made to act, by way of experiment, upon oars, upon paddles, and upon flutter-wheels. Nothing in the success of any of these experiments appeared to be a sufficient compensation for the expense, and the extreme inconvenience of the steam-engine in the vessel.

“There are, indeed, general objections to the use of the steam-engine for impelling boats, from which no particular mode of application can be free. These are, 1st. The weight

of the engine and of the fuel. 2d. The large space it occupies. 3d. The tendency of its action to rack the vessel and render it leaky. 4th. The expense of maintenance. 5th. The irregularity of its motion, and the motion of the water in the boiler and cistern, and of the fuel-vessel in rough water. 6th. The difficulty arising from the liability of the paddles or oars to break, if light; and from the weight, if made strong. Nor have I ever heard of an instance, verified by other testimony than that of the inventor, of a speedy and agreeable voyage having been performed in a steam-boat of any construction. I am well aware that there are still many very respectable and ingenious men, who consider the application of the steam-engine to the purpose of navigation as highly important, and as very practicable, especially on the rapid waters of the Mississippi; and who would feel themselves almost offended at the expression of an opposite opinion. And perhaps some of the objections against it may be obviated. That founded on the expense and weight of the fuel may not, for some years, exist on the Mississippi, where there is a redundancy of wood on the banks; but the cutting and loading will be almost as great an evil.

“ I have said thus much on the engines which have been constructed among us for the purpose of navigating boats, because many modes of working and constructing them have been adopted which are not used in Europe. Not one of them, however, appears to have sufficient merit to render it worthy of description and imitation; nor will I, unless by your further desire, occupy your attention with them.”

The principal *innovations* which Mr. L. mentions (for experience does not allow him yet to call them improvements), are the *wooden boiler*, and the *cast-iron boiler*. The former of these had been introduced into distilleries by Mr. Anderson, and the latter has been added to the steam-engine at Philadelphia by himself. These are illustrated by a number of drawings. He states, however, as an improvement to the engine, a more advantageous construction of its air-pump. By Watt and Bolton's air-pump, the condenser is only *once* emptied of its water of condensation, and of the air produced, at every stroke. The superiority of Mr. L.'s air-pump consists in its *evacuating* the condenser *twice* at every stroke, thereby creating a much better vacuum, and, of course, adding considerably to the power of the engine, in proportion to the diameter of its cylinder, without increasing friction. We recommend the artist and the man of business to the memoir itself.

Mr. Robert Hare, jun. in his *Account of a cock with two perforations, contrived to obviate the necessity of a vent-peg in tapping air-tight casks* (p. 105), has described a pretty mechanical contrivance to obviate some of the inconveniences of broaching barrels, puncheons and butts of closely-bunged liquors. We believe with the inventor, that much vinous liquor would be saved from sourness and vapidness by the general adoption of the instrument.

X. On *American Antiquities* there is a paper by the Right Rev. Bishop Madison, of Virginia. He treats of the supposed Indian fortifications in the western country, and adopts an entire new opinion concerning them. Having visited some of these remarkable works on the river Kanhawa and its vicinity, he has been induced wholly to reject the common belief of their being fortifications or military works. His reasons for this conviction we offer in his own words. (p. 134.)

“1. Those works were not designed for fortifications, because many of them have the ditch within the enclosure, and because the earth thrown up, or the supposed parapet, wants the elevation necessary for a defensive work. Both these circumstances occur, without exception, so far as my observations went, in all those which present an entire, or nearly a regular circle. The imaginary breast-work induces a belief that it never exceeded four or five feet in height. At present the bank seldom rises more than three feet above the plain; and it is well known, that in ground which does not wash, a bank of earth, thrown up in usual way, will lose very little of its height in a century, or twenty centuries: one-fourth for depression would be more than a sufficient allowance. But, we will not rest our argument upon what may, perhaps, be deemed a disputable point. The ditch, even at this day, affords a certain criterion by which we may judge of the original elevation of the bank. Its width seldom exceeds four feet at its margin; its depth is little more than two feet. Such a ditch, making every allowance for the operation of those causes which tend continually to diminish its depth, whilst some of them are at the same time increasing its width, could not have yielded more earth than would form a bank of the elevation mentioned. If the width, now, be not greater than that ascribed, we may be assured that originally it was a very trifling fosse. But you will naturally ask, Are there not some found which present a different aspect, and which evidence more laborious efforts? No: on the contrary, it is remarkable that the kind of which I am now writing have as constant a simi-

larity to each other as those rude edifices or cabins which our first settlers rear. The description of one will answer for all; There is no anomaly, except, now and then, in the diameter of a circle; and here the variation will only amount to a few yards.

“ Permit me now to ask, whether the military art does not necessarily require that the ditch should be *exterior*; and whether, among any people advanced to such a degree of improvement in the arts as to attempt defensive works by throwing up earth, a single instance can be adduced in which the ditch has not an exterior position? Again; Can we believe that a work, having a bank or a ditch not higher or deeper than I have mentioned, could be intended as a fortification? The moment which gave birth to the idea of a defensive work, would also show that it must, in its execution, be rendered adequate to the end contemplated. It is scarcely worth while to go back to Livy or Polybius upon this occasion; but they both inform us, ‘ that the Romans, in the early period of their warfare, dug trenches, which were, at least, eight feet broad by six deep; that they were often twelve feet in breadth, sometimes fifteen or twenty; that, of the earth dug out of the fosse, and thrown up *on the side of the camp*, they formed the parapet, or breast-work; and, to make it more firm, mingled with it turf, cut in a certain size and form. Upon the brow of the parapet palisades were also planted, firmly fixed and closely connected.’ The form of the fortification was always square. System appears to have been the tutelar deity of the Romans. They always proceeded upon one plan. As to the form, indeed, there appears to be no reason why that should not vary, not only among different nations, but with the same nation, as different situations might require. The Greeks generally preferred the round figure; but with them the nature of places decided the question as to form. In other respects the decision must be made according to fixed and unalterable principles. The same reasons which determined every particular as to height, depth, and position of the earth thrown up, among the Romans, would equally determine the conduct of any other nation. What defence required, what would oppose a sufficient obstacle to human agility, was the point to be decided; and this point would be decided in nearly the same manner by every people unacquainted with gun-powder. The decision would not admit of such fosses and parapets as we find dispersed over the western country. Man, in this new world, has lost no portion of his former agility.

" 2dly. Because, near to most of these imaginary fortifications, and I think I may say, near to every one which is formed upon the plan first mentioned, in a direct line with the gateway, you will find a mound, of an easy ascent, and from ten to twenty feet in height. These mounds effectually command the whole enclosure. There is not a missile weapon which would not, from the height and distance of the mound, fall within the fortification; nor would they fall in vain. But, to rear a fortification, and then build a castle or mound without, at the distance of forty or fifty yards, which would give to an enemy the entire command of such a fortification, would be as little recommended by an Esquimaux as by a Bonaparte. The truth is, no such blunder has been committed; there is no such discordancy of means to be here found. On the contrary, we may trace a perfect harmony of parts. Those mounds are universally cemeteries. Wherever they have been opened we find human bones and Indian relics. They have grown up gradually, as death robbed a family of its relatives, or a tribe of its warriors. Alternate strata of bones and earth, mingled with stones and Indian relics, establish this position. And hence it is that we find, near the summit of those mounds, articles of European manufacture, such as the tomahawk and knife; but never are they seen at any depth in the mound. Besides, it is well known, that, among many of the Indian tribes, the bones of the deceased are annually collected and deposited in one place; that funeral rites are then solemnized with the warmest expressions of love and friendship; and that this untutored race, urged by the feelings of nature, consign to the bosom of the earth, along with the remains of their deceased relatives and friends, food, weapons of war, and often those articles which they possessed and most highly valued when alive. This custom has reared, beyond doubt, those numerous mounds. Thus, instead of having any relation to military arrangements, or involving the absurdity before mentioned, they furnish, on the contrary, strong evidence that the enclosures themselves were not destined for defensive works; because, reared as these mounds have been, by small but successive annual increments, they plainly evince that the enclosures, which are so near to them, have been, not the temporary stations of a retiring or weakened army, but the fixed habitation of a family, and a long line of descendants.

" That these mounds, or repositories of the dead, sometimes also called barrows, were formed by deposition of bones and earth, at different periods, is now rendered certain by the per-

fect examination to which one of them, situated on the Rivanna, was subjected by the author of the Notes on Virginia. His penetrating genius seldom touches a subject without throwing upon it new light. Upon this he has shown all that can be desired. The manner in which the barrow was opened afforded an opportunity of viewing its interior with accuracy. 'Appearances,' says he, 'certainly indicate that it has derived both origin and growth from the accustomed collection of bones, and deposition of them together; that the first collection had been deposited on the common surface of the earth, a few stones put over it, and then a covering of earth; that the second had been laid on this, had covered more or less of it, in proportion to the number of bones, and was then also covered with earth, and so on. The following are the particular circumstances which gave it this aspect. 1. The number of bones. 2. Their confused position. 3. Their being in different strata. 4. The strata in one part having no correspondence with those in another. 5. The different states of decay in these strata, which seem to indicate a difference in the time of inhumation. 6. The existence of infant bones among them.' (P. 178, first Paris edit.) The number of bones in this barrow, or mound, which was only forty feet in diameter at the base, and above twelve in height, authorised the conjecture that it contained a thousand skeletons. Now, as all those numerous mounds, or barrows, have the most obvious similarity, we may conclude, that what is true of one of them, is, *cæteris paribus*, applicable to all. The only difference consists in their dimensions. I visited one, situated on the low grounds of the Kanhawa, which might be almost called the pyramid of the west. Its base measured 140 yards in circumference; its altitude is very nearly 40 feet. It resembles a truncated cone: upon the top there is a level of twelve or thirteen feet in diameter. A tall oak, of two feet and a half in diameter, which had grown on the top, and had long looked down upon the humbler foresters below, had experienced a revolutionary breeze, which swept it from its majestic station, apparently above six or seven years before my visit. Within a few miles of this stands another, which is said to be higher. No marks of excavation near the mound are to be seen. On the contrary, it is probable, from the examination which was made, that the earth composing the mound was brought from some distance: it is also highly probable that this was done at different periods; for we cannot believe that savages would submit to the patient exertion of labour requi-

site to accomplish such a work at any one undertaking. Near to this large one are several upon a much smaller scale. But, if that upon the Rivanna, which was so accurately examined, contained the bones of a thousand persons, this upon the Kanhawa would contain forty times that number, estimating their capacities as cones. But who will believe that war has ever been glutted with so many Indian victims by any one battle? The probability seems to be, that those mounds, formed upon so large a scale, were national burying places; especially as they are not connected with any particular enclosure; whilst those upon a smaller scale, and which are immediately connected with such a work, were the repositories of those who had there once enjoyed a fixed habitation. But whether this conjecture be admitted or not, the inferences from what has been said under this head, that those enclosures could not be designed as fortifications, will, I think, be obvious to every one.

“3dly. Because those supposed fortifications not unfrequently lie at the very bottom of a hill, from which stones might be rolled in thousands into every part of them, to the no small annoyance, we may readily conceive, of the besieged.

“4thly. Because, in those works which are remote from a river or a creek, you find no certain indications of a well: and yet that water is a very necessary article to a besieged army will be acknowledged on all hands.

“5thly. Because those works are so numerous, that, supposing them to be fortifications, we must believe every inch of that very extensive country in which they are found had been most valiantly and obstinately disputed. For, upon the Kanhawa, to the extent of 80 or 100 miles, and also upon many of the rivers which empty their waters into it, there is scarcely a square mile in which you will not meet with several. Indeed, they are as thick, and as irregularly dispersed, as you have seen the habitations of farmers, or planters, in a rich or well settled country; but, notwithstanding their frequency, you no where see such advantageous positions selected, as the nature of the ground, and other circumstances, would immediately have recommended to the rudest engineer, either for the purpose of opposing inroads, or of giving protection to an army which was too weak to withstand an invading enemy. The union of Elk and Kanhawa rivers affords a point of defence which could not have escaped the attention of any people; and yet we find no fortification at this place, but many dispersed through the low grounds in its vicinity.”

XI. *Philology.*—*Hints on the etymology of certain English words, and on their affinity to words in the languages of different European, Asiatic, and American Indian nations.* By Dr. Barton. Some years ago the author published a work on the origin of the tribes and nations of America. In this he exhibited a number of comparative vocabularies. The paper before us is a continuation of those inquiries; wherein, by an examination of various nouns, adjectives and verbs, he shows a resemblance between certain tongues spoken by savage and barbarous people very widely-remote in their settlements, and between several of those languages and our own. Dr. Barton has found so many and such striking similitudes in the tongues which he has examined, that, "had the books of Moses perished; had no memorials concerning them escaped the numerous revolutions of our globe; had no traditions concerning the origin of the species been transmitted to us; the researches of philosophers, through the medium of language, (such is the pure certainty of science!) would have conducted them to the great historical truth, that Asia has been the cradle of the world."—The curious in philological speculations will peruse this paper with interest.

We now take our leave of this respectable volume, in expectation that it will be followed by another in a moderate course of time.

ART. IV. *A Dissertation upon the Cholera Infantum; to which are added Rules and Regulations, as preventive Means of the autumnal Diseases of Children; which gained the Boylstonian Prize, for the Year 1803.* By James Mann, A. M. Fellow of the Massachusetts Medical Society. 8vo. p. 51. Boston. Young & Minns. 1804.

THE respectful terms in which we announced this performance at page 217 of the last number, are doubtless in the recollection of our readers. It gives us pleasure to perceive such a mark of increasing attention to the cultivation of medical science in the State of Massachusetts, as that presented by the institution of the *Boylstonian* prize, for which the author of this Dissertation was the first successful competitor. The benefits arising from similar establishments in other places, together with the known enterprise and emulation of the people of the United States, afford a sufficient pledge of the usefulness which may be expected to result from the fund

so liberally appropriated by the patriotic and philanthropic BOYLSTON.

The author begins the Dissertation with some remarks on the proper appellation to be given to the diseases of which he is about to treat. Among the objects of his inquiry, he means to include all the complaints of the alimentary canal with which children are epidemically attacked during the months of summer and autumn. All the species and varieties of these disorders, however differently modified in external appearance, he considers as radically constituting only one disease, as having their origin from the same common causes, and as being treated by the same general remedies. The history of the disease follows next, and is delivered in a clear and perspicuous manner.

In treating of the causes of this disease, the author mentions and refutes the alleged agency of worms, of dentition, of the fruits of summer and autumn, and of bile. The following quotation will present a distinct view of his opinion concerning the causes which more particularly operate in producing this derangement of the alimentary canal.

“ Filth and dirt are supposed to be one cause of this disease. Under this article are included filthy habitations, dirty clothing, animal and vegetable substances in a state of decay. From the above sources, combined with heat and moisture, is formed an infectious state of atmosphere, which disposes the human body to disease. What the characteristic principles of these subtle materials are, which emanate from reservoirs of filth, eludes our researches. It is probable they may not be dissimilar to those offensive agents, which are generated within the alimentary canal, from acetous and putrid fermentation. These principles of infection must probably always exist in the common atmosphere, but become active only when they are in a concentrated state. This is one reason, which may be offered, why the inhabitants of close settled cities, and populous towns, are more exposed to the scourges of disease, than those of thinly scattered villages. The fatal effects of an infectious atmosphere are already too well known, by the annual epidemics, which prevail in most of our large towns, to require a circumstantial detail. Infants, who are the most susceptible, are generally the first victims of its morbid influence. These offensive materials have been variously denominated, according to what has been supposed their nature and origin; from which are obtained the names, *morbific effluvia*, *marsh miasmata*, *mephitic vapour*, *animalcule contagion*, *putrid fermentation*, *nitrous acid gas*, or *septon*. The materials of expiration and perspira-

XI. *Philology.*—*Hints on the etymology of certain English words, and on their affinity to words in the languages of different European, Asiatic, and American Indian nations.* By Dr. Barton. Some years ago the author published a work on the origin of the tribes and nations of America. In this he exhibited a number of comparative vocabularies. The paper before us is a continuation of those inquiries; wherein, by an examination of various nouns, adjectives and verbs, he shows a resemblance between certain tongues spoken by savage and barbarous people very widely-remote in their settlements, and between several of those languages and our own. Dr. Barton has found so many and such striking similitudes in the tongues which he has examined, that, "had the books of Moses perished; had no memorials concerning them escaped the numerous revolutions of our globe; had no traditions concerning the origin of the species been transmitted to us; the researches of philosophers, through the medium of language, (such is the pure certainty of science!) would have conducted them to the great historical truth, that Asia has been the cradle of the world."—The curious in philological speculations will peruse this paper with interest.

We now take our leave of this respectable volume, in expectation that it will be followed by another in a moderate course of time.

ART. IV. *A Dissertation upon the Cholera Infantum; to which are added Rules and Regulations, as preventive Means of the autumnal Diseases of Children; which gained the Boylstonian Prize, for the Year 1803.* By James Mann, A. M. Fellow of the Massachusetts Medical Society. 8vo. p. 51. Boston. Young & Minns. 1804.

THE respectful terms in which we announced this performance at page 217 of the last number, are doubtless in the recollection of our readers. It gives us pleasure to perceive such a mark of increasing attention to the cultivation of medical science in the State of Massachusetts, as that presented by the institution of the *Boylstonian* prize, for which the author of this Dissertation was the first successful competitor. The benefits arising from similar establishments in other places, together with the known enterprise and emulation of the people of the United States, afford a sufficient pledge of the usefulness which may be expected to result from the fund

so liberally appropriated by the patriotic and philanthropic BOYLSTON.

The author begins the Dissertation with some remarks on the proper appellation to be given to the diseases of which he is about to treat. Among the objects of his inquiry, he means to include all the complaints of the alimentary canal with which children are epidemically attacked during the months of summer and autumn. All the species and varieties of these disorders, however differently modified in external appearance, he considers as radically constituting only one disease, as having their origin from the same common causes, and as being treated by the same general remedies. The history of the disease follows next, and is delivered in a clear and perspicuous manner.

In treating of the causes of this disease, the author mentions and refutes the alleged agency of worms, of dentition, of the fruits of summer and autumn, and of bile. The following quotation will present a distinct view of his opinion concerning the causes which more particularly operate in producing this derangement of the alimentary canal.

“ Filth and dirt are supposed to be one cause of this disease. Under this article are included filthy habitations, dirty clothing, animal and vegetable substances in a state of decay. From the above sources, combined with heat and moisture, is formed an infectious state of atmosphere, which disposes the human body to disease. What the characteristic principles of these subtle materials are, which emanate from reservoirs of filth, eludes our researches. It is probable they may not be dissimilar to those offensive agents, which are generated within the alimentary canal, from acetous and putrid fermentation. These principles of infection must probably always exist in the common atmosphere, but become active only when they are in a concentrated state. This is one reason, which may be offered, why the inhabitants of close settled cities, and populous towns, are more exposed to the scourges of disease, than those of thinly scattered villages. The fatal effects of an infectious atmosphere are already too well known, by the annual epidemics, which prevail in most of our large towns, to require a circumstantial detail. Infants, who are the most susceptible, are generally the first victims of its morbid influence. These offensive materials have been variously denominated, according to what has been supposed their nature and origin; from which are obtained the names, *morbific effluvia*, *marsh miasmata*, *mephitic vapour*, *animalcule contagion*, *putrid fermentation*, *nitrous acid gas*, or *septon*. The materials of expiration and perspira-

tion, when they are suffered to be accumulated, are real poisons. These also, in such states, form spheres of infectious principles around the bodies from which they originate. As the most mortal forms of disease are supposed to have their existence from these causes, it may be literally said of the animal system, even in a state of health, that it is a store-house of infection.

"If the preceding statements are just, *heat* will be considered as one remote cause of the autumnal evacuations of infants; *a torpor of the liver*, induced by the excessive excitement of that active agent, as an intermediate cause; and a *superabundance of acids* in the alimentary canal, in consequence of a defect of gall, as an immediate or proximate cause."

The author's mode of treating these diseases may be seen in the following passages, which we quote in his own words.

"GENERAL TREATMENT.

"1st. The first indication which presents itself in this disease, is to evacuate feculent matter, and other offending materials, from the alimentary canal, and correct acids therein abounding.

"2d. The second indication is to allay inflammation, and alleviate the other injuries, which the alimentary canal may have suffered from the several causes of the disease.

"3d. The third indication is to promote a due secretion of bile, which is deficient in quantity, by removing obstructions from the biliary ducts, or restoring action to the liver; as it is presumed, a torpor of that viscus does exist, as a proximate cause of the disease.

"4th. The fourth indication is to calm the violent commotions, and compose the irritated viscera, occasioned by the violent attack of the disease, or by the necessary employment of emetics and cathartics.

"I. Our first indication is to evacuate feculent matter. This is effected by the employment of emetics and cathartics. Mild emetics and cathartics are to be preferred to drastic. For an emetic, no one article of the *materia medica* is so eligible as *ipecacuanha*, as it produces its operation without debilitating the stomach, and irritating the delicate coats of the intestines, which is often experienced from the *antimonial emetics*.

"For cathartics are employed *calomel*, the principal to be relied upon; *manna*; some of the *neutral salts* have been recommended for this purpose; those in particular which have for their basis pot-ash; viz. *sulphite of pot-ash* (vitriolated

tartar), *tartrite of pot-ash* (soluble tartar), *acidulous tartrite of pot-ash*, (cream of tartar.) These alkaline salts are supposed to be decomposed by the acids, which predominate in the alimentary canal, while their alkaline bases seize on them and neutralize them, and in this state are expelled from it.

“ But, for the intention of correcting acids, a weak solution of *carbonate of pot-ash* (vegetable fixed alkali), or *soda* (marine alkali), should be repeated at intervals of two or three hours, according to the exigencies of the case. This dilute solution of alkali may be employed, during the operation of vomiting, whether excited by the disorder or by art: while the water, in which the *alkali* is dissolved, dilutes the offending materials, the *alkali* is employed in neutralizing the acids, and, by combining with them, prevents their ill effects. Alkalies remove the sensation of heat and burning, which often accompanies severe forms of this disease.

“ II. For the purpose of fulfilling our second intention, which is to allay inflammation, and alleviate the other injuries which the alimentary canal may have suffered, from the several causes of the disease, we employ mercurials. At first administer a full dose of *calomel* for a cathartic. This not only purges away putrid colluvies, congestions, and acidities, but when there is an obstruction of the *ductus choledochus*, it may remove it. Here a repetition of *calomel* is generally necessary, and with intention of absorbing new formed vessels, and removing inflammation from the coats of the intestines, it is to be administered in small doses, with or without opium, as the urgency of the symptoms requires. *Calomel* has been long since employed to promote the secretion of the whole glandular system. Acute and chronic inflammations yield to the all-pervading powder of mercurials. *Calomel* is more especially indicated in that form of disease, where a *tenesmus* accompanies a *diarrhœa*. In these cases, a repetition is most necessary, and when combined with opium, it seems to possess a specific property.

“ Secondly. We allay inflammation, and alleviate other injuries by means of mucilages. In violent forms of this disease, the mucus is separated, and cast off from the bowels by excessive action; great sensibility ensues, so that the softest substances are too harsh for their irritable condition. Here the vegetable mucilages are employed, with evident good effect. From among these, we select gum arabic, sem. lini. sweet elm, white wood, starch. Mucilages prepared from these, co-operate with more active remedies, to effect a removal of the com-

plaint. It is necessary, sometimes, when there is great pain and violent tenesmus, to administer these mucilages with laudanum, by way of enema.

" Thirdly. To remove pain and inflammation in the alimentary canal, blisters are used with much benefit; they appear to alleviate pain, by their counter stimulus.

" Fourthly. The warm bath has been recommended to allay pain, and remove inflammation from the bowels; and from the immediate relief which it affords, we believe that it is of use.

" III. Our third indication is to remove a torpor from the liver. This is to be effected, firstly, by the employment of *calomel* in small doses; to be repeated once in six, eight, or twelve hours. Secondly, by emetics of *ipecacuanha*. These may be usefully administered, in every stage of the disease. Their effects seem to arise from their mechanical operation. During the convulsive throes of the stomach, the liver is forcibly compressed by the abdominal muscles, the bile is expelled from the *vesicula fellea*; or a larger secretion of it is produced. Does an increased torpor, induced upon one viscus, remove a torpor from another, by indirect sympathy? May this be a cause why the liver secretes bile in large quantities during the operation of an emetic?*

" IV. The last indication is to calm the violent commotions, and compose the irritated viscera, occasioned either by the vi-

" * In the infancy of medicine, the only benefit to be expected from the employment of emetics, was the evacuation of morbid matter from the stomach. Modern discovery has, however, demonstrated, that their good effects are not so limited. We will here subjoin the sentiments of Dr. CULLEN, upon this subject, where he observes, that " vomiting excites the force of the circulation in every part of the body. And as there is a special consent between the stomach and the vessels of the surface, so that the several states of these are communicated to one another, the action of vomiting excites, particularly, the action of these vessels." He is further of opinion, " that the stagnation in the system of the vena portarum often lays the foundation of the most obstinate diseases; and therefore the obviating these, by frequent vomiting, is likely to be of much importance to the health of the system." The Doctor adds, " I know of no means of expediting the circulation in the liver, so powerful as that of vomiting." And when mentioning the properties of *Ipecacuanha*, the Doctor is of opinion, " that no emetic is safer, or more proper, or more effectual for opening the obstructions of the biliary ducts, or for promoting the secretions of the liver."* May not the antidysenteric virtue of this emetic be ascribed, rather to the action produced by it, upon this viscus, than to the cathartic operation, which is (according to Dr. Cullen's supposition) promoted, having passed the pylorus into the intestines?

" * Cullen's *Materia Medica*, chap. xix. *Emetica*.

olent attack of the disease, or by the necessary employment of emetics and cathartics. For this purpose sedatives are used; the chief among these is opium. Æther may be sometimes beneficial.

“ PARTICULAR TREATMENT.

“ That we may the better apply our several indications to the particular cases which occur, and carry our curative plan, with more precision, into practice; it is thought to be expedient to divide these alvine diseases of infants into the more distinct forms, under which they usually appear, viz.

“ 1st. Simple diarrhœa.

“ 2d. Tenesmal diarrhœa.

“ 3d. Violent vomiting and purging, commonly denominated Cholera.

“ *First.* DIARRHŒA. Under this form the disease commences with a purging, accompanied with *anorexia*, and sometimes with a *nausea*; the dejections are frequent, light coloured, accompanied with flatus, gripes, but little or no fever; after some days, the discharges become brown, or greenish, accompanied with the mucus of the bowels, and with streaks of yellow, sometimes of blood.

“ *MODUS MEDENDI.* Administer, at first, a cathartic of *calomel*. Then, an emetic of *ipecacuanha*. Two to four grains of *carbonate of pot-ash* (vegetable fixed alkali) every two or three hours, to neutralize acids. One to ten drops of *laudanum* at night. If the purging continues, repeat the emetic of *ipecacuanha*; perhaps *calomel*. *Calcareous carbonate* (chalk lime) has been found to check the purgings in this mild form of the disease, sooner than the alkaline remedies.

“ More than forty patients have been treated with success this season by the above method, without the loss of one. Many of the diseases were removed, after the administration of a cathartic of *calomel*, and an emetic, in two or three days with *chalk*. Some of the above cases had been of some weeks standing. The dose of chalk was five or six grains levigated, and intimately incorporated with water, and administered every three or four hours. When the gripes prevented sleep, a few drops of *laudanum* were added.

“ *Second.* TENESMAL DIARRHŒA. This form of the disease commenced generally with *nausea*, vomiting and purging. The fever and heat are great at first. There are much pain in the intestines, and gripes. The stools are copious and thin; their colour is light; very soon they become small, dark, slimy,

and streaked with blood. There is often an effort to stool, without any evacuation of feculent matter. The frequent inclination to stool is caused by an irritation upon the inflamed lining of the *rectum*.

“*MODUS MEDENDI.* Administer a full dose of *calomel* for a cathartic, to evacuate feculent and other offending materials; then, from one fourth of a grain to three grains of *calomel*, every sixth, eighth, or twelfth hour. Give *alkalies*, *lime water*, *magnesia* or *chalk* every two or three hours, during the continuance of the disease. The dose of *alkalies* is from one to four grains. The dose of *magnesia* and *chalk*, five to six grains. Next day, *Ol. Ricini* for a cathartic; and repeat the *calomel*; and the correctors of acids. When the disease continues, and appears obstinate, apply a blister upon the abdomen; warm baths. As soon as cathartics have thoroughly evacuated the bowels, join from one to ten drops of *laudanum* to the *calomel* at night; and oftener, if necessary to remove gripes. If, after inflammation and tenesmus are abated, an *anorexia*, or *nausea* continues, administer an emetic of *ipeca-cuanha*, to excite the liver into action, and promote the secretion of bile.

“*Third.* Violent vomiting and purging, or what is commonly called *CHOLERA*.

“When the disease commences its attack under this form, no time is to be lost. Emetics and cathartics are seldom necessary. The patient soon sinks under excessive evacuations, accompanied with pain from inflammation. Where the pulse is sufficiently strong, it is advisable to bleed, in small quantities, to obviate indirect debility. The difficulty we experience in bleeding infants has often prevented its employment.

“*MODUS MEDENDI.* Administer a dilute solution of *alkali*, and repeat it as often as it is rejected. If vomiting continues, add to the *alkalies* from one to ten drops of *laudanum*. When there is a great exhaustion of strength, and evacuations continue, the danger is extreme. If *laudanum* will not stay upon the stomach, embrocate the stomach with the strongest *laudanum*, and, at the same time, apply a blister upon the back. Administer clysters, with *laudanum*. Where there is an inverted motion of the whole alimentary canal, and the fecal materials are vomited, apply assiduously the *laudanum*. Blister the back and extremities. Inject clysters of cold water. Smear the skin all over with oil. The two last articles are recommended by Doctor DARWIN.* In this last form of the

* *Zoonomia*, chap. i. 3. 1. 6.

disease, indirect debility suddenly follows excessive inflammation.

“The success which has attended the preceding method of practice, authorises us to recommend it to further attention. Of more than one hundred, who have been seized with the fore-mentioned disease, under its several forms, and have been subjected to the above methods of cure, during the present and preceding seasons, only one has died; and this was a child of two years of age. It continued after the first attack only twelve hours. It had been under the operation of violent vomiting and purging nine hours, previous to the calling of medical advice, when there were a feeble and intermittent pulse, a great prostration of strength, and a receding of heat from the extremities; in fact, death was depicted on its countenance. Alkalies were here administered, with opium, and blisters applied; the vomiting immediately ceased; but, it is supposed, more on account of a total exhaustion of excitability, than from any beneficial effects of the medicine.

“Among the various remedies which have been employed in the cure of these diseases of the alimentary canal, and which have obtained considerable reputation, is the *sulphate of Zinc*, (vitriol of Zinc); and we are convinced, from our own experience, that it is not an ineffectual medicine. Next to *ipe-cacuanha*, it is the mildest and safest emetic with which we are acquainted; and, when it is administered in small doses, and frequently, it proves gently cathartic. In addition to the above sensible effects, when it is administered in still smaller doses, it seems to remove inflammation from the intestines, and consequently allay tenesmal complaints, upon the same principle by which it cures *ophthalmia*.

“In some forms of this disease we have experienced considerable benefit from the *saccharum saturni*; in one instance, particularly, where, after there had been a long continuance of purging, the evacuations suddenly changed from a common diarrhoea, with fecal discharges, to one of pure blood. As these last evacuations were unaccompanied with pain, we presume that the blood discharged proceeded immediately from the liver; which, in consequence of its torpor, permitted this fluid to pass, unchanged, by the secretory organs, through its vessels, as if they had been inactive tubes. In this case, *Sac Saturni*. two grains, with one grain of *opium*, were administered, and repeated at the expiration of eight hours. The purgings immediately ceased altogether; when two or three emetics of *ipe-cacuanha* were given to excite the liver into action; after

which, by means of the bark and wine, with a soft nutritious regimen, a speedy restoration was obtained.

“ To enumerate the catalogue of medicines, in common use, for these complaints of the alimentary canal, among the inhabitants of the country, would be to fill up a volume with absurdities and contradictions. Most of these belong to the classes of bitters and astringents. Upon these, we are convinced, from our experience, that no dependence can be placed. Bitters and astringents never should be administered until the disease is entirely removed; for, so long as there are remains of inflammation upon the internal coats of the alimentary canal, these articles seem only to augment it; they increase the discharges, with pain, rather than allay them.

“ However, during a state of convalescence, we have, after the purgings have entirely ceased, experienced much benefit from the use of the *bark*, *columbo root*, *marsh root*, and *blood root*, especially where there appeared to be a want of appetite and digestion.

“ We have removed a chronic *diarrhœa* of some months standing, by means of a woollen waistcoat, closely laced about the abdomen, in a few days, after all other means had failed; perhaps it cured the disease upon the same principle that the spiral bandage cures swelled legs, by promoting absorption.”



MEDICAL & PHILOSOPHICAL NEWS.

DOMESTIC.

STEAM ENGINES,

Project for the Improvement of Steam Engines, published by Oliver Evans, Inventor of the Elevators and other Mill Machinery.

THE present English steam engine, so much celebrated, consisted, in its first state, of a boiler to generate the steam; to which was connected a cylinder, open at top, in which a piston moved up and down, which was attached to a working beam, hung on its centre, the other end of which was connected to a pump. The steam was let into the cylinder below the piston, to balance the atmosphere; and the weight of the pump rod, at the opposite end of the beam, raised the piston up to the top of the cylinder; the steam was then shut off, and a jet of cold water let into the cylinder, to condense the steam, and form a vacuum under the piston in the cylinder; and then the weight of the air on the top of the cylinder, which is 15lbs. to every square inch of its area, being no longer balanced, was the power which drove down the piston and drew up the pump rod to make a stroke. If they could have made a perfect vacuum by these means, the power of the engine would have been 15lbs. to every inch area of the piston; but it was found not to exceed 10lbs. and required large quantities of fuel, great part of the steam being lost in heating up the cylinder at every stroke, which was cooled by the jet of cold water. This is called the single-stroke engine.

The celebrated James Watt improved this engine, by making his steam of power equal to the weight of the atmosphere, and letting it in at the top of the cylinder, to supply the place of the atmosphere to push down the piston, while the steam was condensed below, and also at the bottom, while condensation was going on above, making a double stroke; and to avoid the loss occasioned by the jet cooling the cylinder, he led the steam off from each end of the cylinder into a separate vessel, into which he let the jet of cold water, to condense the steam; and he found by these means he could make a more

perfect vacuum, and computed the power of his engine at between 11 to 13lbs. to the inch, and the expense of fuel was greatly lessened.

This is Watt's double-stroke steam engine, so celebrated and very justly deemed the greatest of all human inventions. Although it be so limited in its power, to double the power they make an engine of double capacity, and it requires double fuel. This engine labours under the following disadvantages; there is a continual accumulation of air in the condenser generated by boiling the water, which would destroy the vacuum in a short time, and stop the engine; therefore an air pump is constantly at work to extract it. Also a continual accumulation of sediment, which adheres to the bottom of the boiler, forming a non-conductor of heat, causing the boiler to burn out; they are obliged to stop once or twice a month, let all cool, open the boiler to go inside to scrape away the sediment.

The boilers are constructed to bear little or no power of steam, their principle being to make the steam inside the boiler equal to the atmosphere outside; and if ever the safety-valve is overloaded, or a double weight laid on by accident, and the steam does not get vent, the boiler explodes; and if ever the steam in the boiler is suddenly condensed by a dash of cold water on its top, &c. it collapses, being pressed in by the weight of the atmosphere. The principles of the engine are dangerous, ever liable to these accidents, and it was generally believed that nothing could be gained by increasing the power of the steam to exceed atmospheric power.

My ideas of the application of the power of steam were very different at the first. I conceived the power to be irresistible; that the power increased in some very rapid ratio, as we increased the heat in the water; otherwise it could not rise to such a pitch in so short a time, as to make the terrible explosions which I had known of: I supposed that double heat in the water, would give eight, or sixteen, or perhaps thirty-two times the power of steam. On these principles I conceived that I could obtain any power I pleased, simply by confining the steam and increasing the heat, and perhaps with less fuel, and a much smaller engine. After I had commenced the construction of an engine on these new principles, I was informed that some curious and philosophic gentlemen had made a set of accurate experiments, the result of which was that every addition of thirty degrees of heat to the water by Fahrenheit's thermometer, be the temperature what it may, doubles the bulk and elastic power of steam, (but had not even suggested

that this principle might be applied to any use), which ratio, continued from two hundred and twelve to four hundred and twenty-four degrees double heat in the water, gives one hundred and twenty-eight times the power of steam; and it is absurd to suppose that it would acquire one hundred and twenty-eight times the fuel to be expended in an equal time to produce double heat in the water, and if not then, this new principle will require less fuel to produce equal power.

To apply this wonderful principle, I construct my boilers of circular cylindric forms of small diameters, the best possible form to contain a great elastic power; and to enlarge their capacity, I extend their length or increase their number, which also gives a large surface for the fire to act on, making them sufficiently strong to contain steam of elastic power, equal to 1500lbs. to the inch area of the piston, which would give my engine 100 times the greatest possible power of the English principle: but at the same time arranging the work so that 50lbs. to the inch power will be sufficient in ordinary cases, and so that we cannot without considerable trouble and difficulty, ever raise the powers to exceed 150lbs. to the inch in the most extraordinary case; greater power we will never want, which makes the engine perfectly safe from explosion, as it will bear from ten to thirty times the power that we shall ever have need of using, and be from five to ten times as powerful as Watt's engine. I have an engine in operation in the most simple form without a condenser, which is capable of performing three times the work with equal fuel, compared with the English engine; and succeeds according to the theory, working with steam, generally equal in power from 50 to 100lbs. to the inch; doubling the fuel appears to produce about 16 times the power and effect. Its great power and simple structure fits it for propelling boats up the Mississippi, and carriages on turnpike roads; two of the most difficult applications; therefore will apply to all others as a powerful agent.

I have conceived further, and still greater improvements, which I wish to put in operation.

1st. The inexhaustible steam engine, so called, because it is arranged on such principles that the water in the boiler will not be exhausted by boiling and working the engine; by which means I evade the accumulation of sediment from the water, to form a non-conductor of heat on the bottom of my boiler, which will cause it to last ten times as long. I also evade the accumulation of air to interrupt the vacuum, by which means my vacuum will become more perfect, and the engine have

more power, and require less fuel. The principles on which this is done may be easily conceived, if we suppose a still with its condenser so elevated that the worm, after it leaves the condenser, may be turned to lead the spirits back into the still; this still may in theory be boiled for ever, without being exhausted. Thus, after the steam has passed through my engine, it is condensed into water, and returns into the boiler again, and no sediment or air can accumulate from water distilled many times over.

2d. The volcanic steam engine, in which I attempt to use the principles of the natural volcano, where the furnace and boiler are in one, and where the fire burns without the aid of the atmospheric air to kindle it; but until I shall discover a fuel which will so burn, I use a forcing air pump to kindle the fire. In this engine the boiler and furnace are united, the water round the fire and the flue of the furnace is made to discharge immediately into the water at the bottom of the boiler, and bubble up through it, communicating all the heat of the fire to the water, to generate steam, and all the elastic fluid generated by the combustion of the fuel, which I must suppose will be expanded to at least two thousand times the bulk of the fuel, unites with the steam to work the engine, by which means not more than one fourth part of the fuel will be required, which fits this engine for boats or carriages better than the others.

3d. The perpetual still is arranged on such principles, that the beer is received at one end, to pass slowly on to the other; during which time the spirit is extracted, and the dregs pass off at the other end in a continual stream. And in which, principles are adopted to suppress the watery vapour until the spirituous vapour may rise with a very rapid process, to obtain purer spirits at the first distillation.

The principles of this invention may be conceived, when we consider the common process of distillation, which I conceive to be as follows, viz. The pressure of the atmosphere, which is equal to 15lbs. to every square inch surface of the beer in the still, suppresses the watery vapour until the beer is heated to 212 degrees of Fahrenheit's thermometer, or boiling heat; but the spirits being more volatile, its vapour is about double as powerful, and will rise under that pressure at 170 degrees heat, 42 degrees below the boiling point of water: now, while the heat is kept between those two points, purer spirits are obtained; but the process is too slow, and the distiller to increase it, makes his still boil, which raises large quantities of watery

with the spirituous vapour. Now it appears evident, that if we pursue the path pointed out by nature, we may, by increasing the pressure, suppress the watery vapour until the spirits rise rapidly, and use less fuel; but this is much more difficult to explain. Any further explanation required, I am willing to give.

Remarks on Mr. Evans's Project, and an Account of other Improvements in Steam Engines, by John Stevens, Esq. of Hoboken: Communicated in the following Letters to Dr. Mitchill.

New-York, January 9th, 1805.

DEAR SIR,

Your favour of the 6th instant I have this moment received. Among other projects of Mr. Evans's, I find you enumerate improvements in distillation. Here Mr. Evans and myself are likely to interfere. The idea of distilling with steam is not new. Count Rumford has suggested its practicability in one of his essays. You must observe that Mr. Evans and myself work the steam engine without any condensing apparatus. This steam then, after its discharge from the cylinder, without any diminution of temperature, may be applied to the purpose of distillation. This application of steam naturally suggested itself to me when I first made my experiments on working a steam engine with steam at a high temperature. I have accordingly invented a still adapted to the purpose, simple and cheap in its construction, and calculated to produce spirit of a much better quality than can be obtained in the ordinary way of distilling. A description of my contrivance you will find enclosed; and as it may, in case of interference, prove of use to me, I wish you to preserve this letter and that description, noting thereon the date of its reception.

Of Mr. Evans's volcanic engine, I lately received a description from Dr. Coxe, of Philadelphia, from which, I must confess, I did not form the most exalted opinion of Mr. Evans's project. From the many difficulties that presented themselves, it really appeared to me he was in pursuit of an *ignis fatuus*.

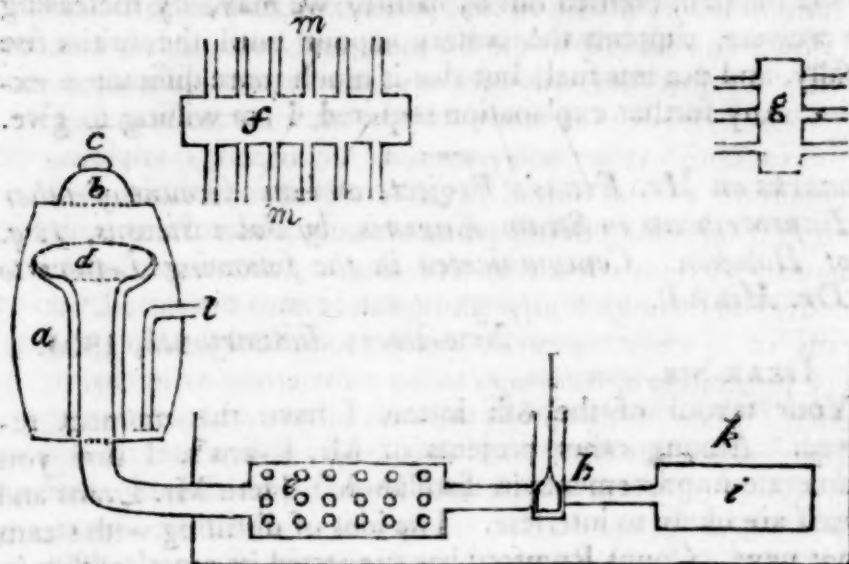
You say you "started a doubt respecting his supposed improvement in distilling. But although he would not listen to it, the doubt exists as strong as ever." Now, my dear Sir, I intreat you to take the same liberty respecting my projected improvements, and I shall not only listen to you, but thank you into the bargain.

Believe me to be, dear Sir, with great esteem and regard,

Yours, &c.

JOHN STEVENS.

DESCRIPTION OF A STILL.



a, A common rum hogshead lined with tin or thin sheet copper; *b*, a hemispherical dome of sheet copper; *c*, the handle by which it is readily removed off and on, and as the pressure will be inwards, it will be easily kept tight; *d*, a double tube and funnel, with charcoal, or other non-conducting substance between; *e*, a section of the condenser; *f*, a horizontal section; *g*, a perpendicular section of the ends; *m, m*, metal tubes; *h*, a pump, discharging the spirit (and a small portion of uncondensed vapour and air necessarily remaining in the condenser) into a smaller condenser, *i*. The whole condensing apparatus contained in a vessel, *k*, filled with water; *l*, steam pipe descending nearly to the bottom of the hogshead, and there inserted into a circular plate, perforated with small holes to distribute the steam equally. You may have any number of hogsheads, communicating with the condenser, *e*, so as to keep constantly at work, and on as large a scale too as you choose. I forgot to mention, that a jet of cold water must be kept constantly playing on the dome, *b*.

This construction of a still (every part of which, as far as I know, is new) will, I flatter myself, effect many important improvements in the practice of this art.

In the first place, I take it for granted, it will remedy effectually a defect of the common mode of distilling, which has hitherto remained incurable, and which depreciates spirits from grain, &c. 50 or 100 per cent. I mean the evolution of an empyreumatic oil. To prevent as much as possible this vile contamination of the spirit, a contrivance is now used to stir

the liquid in the still. This, though of great service, is by no means effectual, as the low price of rye-whiskey fully proves. In spite of every attention and precaution, some particles will fall down and adhere to the bottom, and become more or less burnt. Against the mischievous effects thus produced, the above contrivance must completely guard in two ways. First, as the vacuum in the condenser must be nearly complete, the temperature of the liquid in the hogshead will be reduced from 212 deg. the boiling point of water under the pressure of the atmosphere, to less than 100 deg. Secondly, as the heat is conveyed through a pipe immediately into the liquid, and by means of a cock, is under perfect controul and regulation, every possibility of burning can be prevented; whereas, in the ordinary mode of distilling, the rays of heat, at a temperature of perhaps not less than 1000 deg. impinge against the bottom of a copper boiler in which the liquid is contained; if then, any sediment is deposited on this bottom, so that the liquid does not come in immediate contact with it, the metal will instantly acquire a very high temperature, and, of course, burn whatever may be in contact with it.

I shall not detail the many other advantages resulting from the construction of a still as above described, as they, no doubt, will readily occur to you. I will just mention, that connected with a steam engine on my plan, the fuel necessary for distilling in the common way is entirely saved.

New-York, January 12th, 1805.

DEAR SIR,

I am this moment favoured, by Dr. Miller, with Mr. Evans's "Project for the Improvement of Steam Engines." He begins with a short history of this noble machine, but has (I will not say through design) omitted mentioning the first attempts made by Captain Savary, in which this very principle of working a steam engine, with steam at a high temperature, and with great elasticity, was resorted to, but without success, although he used boilers, strengthened with radiating bars and bolts within, and strongly hooped without. Here, then, we find the principle of using strong steam, at a high temperature, is actually as old as the invention of the steam engine itself. Mr. Evans, then, can surely have no well-grounded pretensions to a claim of invention with respect to this principle. That the elasticity of steam is increased by an increment of temperature, is surely no novel discovery. But that this increment should bear a very small proportion to the quantity of heat required for

the conversion of water into steam, was a natural and obvious deduction from the important discoveries of Dr. Black respecting latent heat. These discoveries you have yourself, no doubt, heard the Doctor detail in his lectures some twenty years ago; and Mr. Belancour's experiments, instituted for the express purpose of ascertaining the ratio of increment of the elasticity of steam, at different temperatures, were made in 1790. Experiments, for the like purpose, were also made by the Editors of the *Encyclopædia Britannica*, and published therein a dozen years ago. The application of this very important law of increment, developed by these gentlemen, to the improvement of the steam engine, was obvious; the great desideratum was to construct a boiler, sufficiently strong to withstand a very great pressure of steam. "To apply this wonderful principle," says Mr. Evans, "I construct my boilers of circular cylindric forms of small diameters, the best possible form to contain a great elastic power; and to enlarge their capacity, I extend their length, or increase their number." Here Mr. Evans, for the first time that I have heard of, assumes to himself a principle, for which I have obtained a patent near two years ago. For I would ask, whether his boilers before, or even since, have been constructed upon the principle above stated? The boiler he used at the time my patent was obtained, was a metal cylinder of 20 inches diameter, and 20 feet long, surrounded by an exterior one of wood. His present boiler is a like cylinder placed in brick work. The only difference between them is, that in the former the fire was made within the cylinder; in the latter it is made to surround it. He has made no attempt to diminish the diameter of his cylinder, or to increase the number of cylinders. The latter, indeed, he could not do without a manifest interference with my patent. Of this, I doubt not, Mr. Evans himself would be sensible, were he to peruse my specification filed in the patent office.

But, it seems, Mr. Evans has "conceived further, and still greater improvements, which he wishes to put in operation."

1st, "The inexhaustible Steam Engine." I have nothing to say about this notable project, further than that many years ago, long before I had heard any thing of Mr. Evans, it occurred to me that a condenser might be so constructed, as that by exposing a large surface within a small compass, the steam might be so nearly condensed, as to render a jet of cold water unnecessary; but, upon trial, I must candidly confess, it did not answer equal to my expectations. The reason is obvious; the heat could not be conveyed *through* the metal with sufficient

rapidity, so that the temperature *within* the condenser should be sufficiently low to condense *all* the steam.

2d. "The volcanic Steam Engine." But till he shall have discovered a fuel which will burn without the aid of atmospheric air, I shall desist from saying any thing about his intended application of this project, to propelling boats and wheel carriages.

3d. "The perpetual Still." Here, if I understand Mr. Evans, he assumes a very erroneous principle. He concludes that spirits will rise more readily than water, in proportion as the pressure is increased. But the very ingenious experiments of Mr. Dalton have proved incontrovertibly, "that the variation of the force of vapour from all liquids is the same for the same variation of temperature." Thus the force of the vapour of spirit of wine at 175° is equal to 15lb. and the force of vapour of water at 212° is equal to 15lb—increase the temperature of both 30° , and the elastic force of each will be increased equally, viz. to about 26lb. on the square inch. By some experiments made by Mr. Achard, of Berlin, it would, indeed, appear that the force of spirituous vapour, when compared to that of water, was in an increasing ratio at given increments of temperature, Thus:

Temp. of watery vapour.	Temp. of spirituous vapour.	Elasticity or force of both.	
		In. Mer.	Difference.
209°	173°	28.1	36
189	154.6	18.5	34.4
168	134.4	11.05	33.6

But Mr. Dalton has proved, from a series of very accurate experiments on the elasticity or force of sulphuric ether, at different temperatures, from 32° to 212° , that the increments of force are in a direct ratio to the increments of force of watery vapour from 142° to 322° . The boiling point of ether in the open air being 102° , that of water 212° .

It is presumable, therefore, that spirit vapour is governed by the same law of increment, and that Mr. Achard has committed some error.

While on the subject of distillation—Can you not suggest to me some varnish or cement, that will resist the action of alcohol, which I may substitute in the place of metal for lining my wooden alembics? But spirits are preserved for any length of time in wooden vessels. *Quere*, Would wood be affected by spirits at a temperature of 100° to 150° ? I am inclined to think that at the *low* temperature of the wash in my still, it may not be necessary to defend the wood from the action of the spirit. I shall at least make a trial.

Mr. Evans, proceeding on the calculations given in the Encyclopædia and by Count Rumford, has been led into an error as well as myself, in estimating the increments of the force of steam with given increments of temperature. It is laid down by these authors, that for every increase of 30° of temperature the elasticity of steam is doubled. But Mr. Dalton has proved that the ratio is not equable and constant, but is a gradually diminishing one.

Temperature.	Force of Vapour.	Temperature.	Force of Vapour.
160	9.46	310	123.53
190	19.00	340	160
220	34.99	370	192
250	58.21	400	226.20
280	88.75	430	260.40 In.

Mer. equal to 130lbs. on the square inch. This we find is very far short of Mr. Evans's extravagant calculation, that 424° gives steam 128 times as strong as steam at the temperature of 212° . From my experiments detailed hereafter, it will appear that this calculation of Mr. Dalton's is too low; that 424° would give steam equal to 450 In. Mer.

Mr. Evans exaggerates enormously the strength of his boiler, when he estimates it capable of sustaining a pressure of 1500lbs. on each square inch. Count Rumford has ascertained, by actual experiment, that a bar of wrought iron, an inch square, will require about 63,000lb. to fracture it. Mr. Evans's boiler is composed of wrought iron a quarter of an inch thick, and as it is 20 inches diameter, or about 60 inches in circumference, $60 \times 1500 = 90,000$ lbs. pressure on each inch of the circumference of his boiler. To withstand this pressure, it ought to be an inch and an half thick instead of a quarter. Contrast this with the tubes of which my boiler is composed of an inch diameter, giving about three inches in circumference, $3 \times 1,500 = 4,500$ lbs. which would require a thickness of only one-fourteenth of an inch of wrought iron.

Mr. Evans considers his inventions, although of the utmost importance, as a bad speculation. My own sad experience, in this bewitching department of experiments and inventions, ought to have taught me long ago, the truth and accuracy of Mr. Evans's calculation. Mr. Evans laments that he has already risked 2000 dollars. Alas! I have risked more than ten times that amount, and although I have been more than twenty years hard at work, I have as yet derived not one shilling advantage from all my various schemes and projects. If, therefore, now that I think I see some prospect of indemnifi-

eration, I should discover some degree of solicitude to secure the property of an invention, no one, I trust, will blame me.

It may not be amiss to mention, that the steam discharged from the cylinder, may be applied to working one of Watt and Bolton's engines; and I think it probable that it would not require more fuel than if worked in the common way. In this case, the whole of the work performed by my engine would be saved.

Mr. Evans tells us, "that the great power and simple structure of his engine, fits it for propelling boats up the Mississippi, and carriages on turnpike roads; two of the most difficult applications." Difficult indeed it must prove, should he attempt to effect either of these purposes with his unwieldy boiler of 20 feet in length, and 3 or 4 feet diameter. It is plain to be seen, that, to perform these very arduous exploits, Mr. Evans does not mean to employ his own boilers, but to avail himself of the principle he has so dexterously assumed to himself, viz. to increase the number of his cylinders. To place this matter in a striking point of view, I will give you the dimensions of a boiler I propose putting on board of a vessel to ply as a passage boat betwixt this place and Albany. Length of the boiler, six feet; breadth, four feet; depth, two feet. A boiler of these dimensions will expose, in the most advantageous manner, upwards of 400 feet of surface to the action of the fire. To expose an equal surface with a boiler on Mr. Evans's plan, would require it to be upwards of 80 feet long; but were it twice that length, it would not give an equal quantity of steam, as it would be impracticable to apply heat to it advantageously.

Pardon the great length to which this letter is protracted: the objects I conceive myself on the point of accomplishing, are of immense importance. You have sent forward Mr. Evans's paper to be inserted in the Medical Repository. This has a wide circulation, not only in the United States, but throughout all Europe. I therefore think, that in justice to myself and the world, I should have an opportunity of asserting and maintaining what I conceive to be my right. I should wish, therefore, that you would forward this and my former letter, with a certified copy of my specification, filed in the patent office, without delay, so that I may be able to insert extracts therefrom, in the same number of the Medical Repository with Mr. Evans's paper.

I am, my dear Sir, with the sincerest regard,

Yours, &c.

JOHN STEVENS.

It may not be amiss to go into a short detail of the progress I have made since obtaining the patent. My object was, in the first instance, to construct an engine, adapted more immediately to the purpose of propelling a boat. This was an error which occasioned the loss of the first season. I constructed a rotary engine, on the axis of which revolved a wheel at the stern of the boat like a wind-mill or smoke-jack. It was impossible to make a more simple application of the power. After repeated trials, however, I found it impracticable to preserve a sufficient degree of tightness in the packing, &c. The yellow fever came on and interrupted my further progress. The next winter I was employed in constructing another rotary engine on a new plan; but this, on trial, proved no better than the first. Thus I lost a whole year, and was compelled, reluctantly, to have recourse to Watt and Bolton's engine. I set immediately to work, and some time in May last had my machinery all on board a boat. My cylinder is $4\frac{1}{2}$ inches in the bore, with a 9 inch stroke. The complex machinery for opening and shutting the valves of Watt and Bolton's engine I have reduced to a single movement. The lever beam I have dispensed with altogether, as also with the condensing apparatus and air pump. My boiler was on a similar construction with the one described in my specification. It was 2 feet long, 15 inches wide, and 10 or 12 inches high, and consisted of 81 tubes, 2 feet long, and 1 inch diameter. As my boat was only 25 feet long, and 5 feet wide, I was not able, with safety, to raise a chimney of more than 3 or 4 feet high. The consequence was, I was unable to establish a sufficient draft between the interstices of the tubes, so as to support a brisk fire; and the power of the engine was, of course, too feeble to give much motion to the boat. I then altered the furnace so as to allow room between the tubes and the brick work for a draft. This was applying the heat of the fire to a great disadvantage; but I could do no better. Under these unfavourable circumstances, however, I made another trial, and gave to the boat a velocity of about four miles an hour. After having made repeated trials with her, my son undertook to cross over from Hoboken to New-York, when, unfortunately, as she had nearly reached the wharf, the steam-pipe gave way, having been put together with soft solder. This threw the crew into some confusion, and by dashing a pail of water suddenly on the boiler, the immediate contraction of the metal cracked a number of the tubes, and thus put an end to all further experiments with this boiler. To avoid a similar accident, I set about

constructing a boiler on another plan. A single plate of brass was placed horizontally, and tubes were screwed into the under side in a vertical direction. It was late in the fall before we could bring our engine into operation again; but for want of sufficient draft, its performance was not much more powerful than before; it was kept agoing occasionally for a fortnight or three weeks, the boat making excursions of two or three miles up and down the river; and, finally, on the approach of winter, the machinery was taken out of the boat. I will just mention, that in the spring, previously to putting it aboard the boat, the engine was set agoing in the shop. At first, a stove pipe was carried out of one of the windows; but with all our endeavours, though the boiler was perfectly tight, we could not raise the safety-valve load with about 50lbs. to the square inch. The flue was then carried out above the roof, and in a few minutes a few shavings would set the engine agoing. As I was impatient to try its performance in the boat, I did not apply it to any sort of work, so that I made no estimate of its power, to ascertain how much work it would perform with a given quantity of fuel. When on board the boat we repeatedly stopped the engine till the steam would raise the safety-valve; when, for a short distance, the boat would go at the rate of not less than seven or eight miles an hour.

I am at present employed in constructing a boiler on a different plan from the last, and which, I expect, will turn out a great improvement on it. And as it will be much larger, and placed in a building with a lofty chimney, I expect to be able to work with a load on the safety-valve of 100lbs. or perhaps 200lbs. to the square inch. And as I purpose putting up a pair of mill-stones, I shall also be able to determine the quantity of work performed with a given quantity of fuel.*

Should this, on trial, as I feel fully confident it will, answer

* That the saving of fuel must be very great indeed there cannot be a doubt. O. Evans states that with a load of 28lbs. to the square inch, three times the work is performed with an equal quantity of fuel. What then may we expect when the elasticity of the steam equals 100lbs. or perhaps 200lbs. on the square inch? The experiments of Dr. Black and others prove, that when water is converted into steam, 800 or 900 deg. of heat are absorbed. Now, an addition of less than 400 deg. would bring this steam to the heat of boiling oil, its elasticity would then (according to my experiments) be equal to 40 atmospheres, or 600lbs. on the square inch. Thus then, if 900 deg. = one atmosphere, 1300 deg. = 40 atmospheres; but to raise the temperature of steam in the above proportion cannot require any thing like 40 times the fuel.

my expectations, I shall immediately set about one on a still larger scale, to be placed on board a vessel to ply as a passage boat between this city and Albany.

I have lately been engaged in making a number of experiments, to ascertain the elasticity of steam at the temperature of boiling oil. In making similar experiments about two years ago, I employed a lever to keep down the valve, with a weight suspended thereon like a steelyard. This mode of operating was necessarily inaccurate. I now pursued a plan which was not liable to the same errors. A brass tube, about ten inches long, and about one inch diameter, was firmly fixed in a perpendicular direction in an iron vessel containing common paint oil; on the top of this tube, the surface of which was perfectly flat, a valve was accurately fitted; the bore of the tube is precisely three-eighths of an inch in diameter; a tea spoonful of water was then poured into the tube (which filled it about one-fourth full), the valve placed thereon, and loaded with 73lbs. After the oil had been made to boil some time, about three-fourths of a pound was gradually removed. To do this readily I made use of nails. An explosion then took place, but without much noise, as the steam was but barely able to make its escape.

This experiment was tried repeatedly with little variation; so that the elasticity of steam, at the temperature of boiling oil, may be depended on, as being ascertained with a considerable degree of accuracy. I am certain it cannot deviate from truth, more than one part in an hundred.

The area of a circle of three-eighths of an inch diameter is very nearly one-ninth of a square inch. Thus then, $72\frac{1}{4}$ lbs. the average of the weights raised by the explosions, multiplied by 9, gives $650\frac{1}{4}$ lbs. on the square inch for the elasticity of the steam at the temperature of boiling oil, which is usually estimated at 600 deg. of Fahrenheit's thermometer. This is an elasticity considerably greater than the result which Mr. Dalton's principles of calculation would afford, but much less than the calculations of Mr. Achard and the Editors of the *Encyclopædia Britannica* would make it. By the experiments of these gentlemen, it appears that from 150 to 280 deg. (which was as far as their experiments extended) an addition of one inch of mercury for every 10 deg. was very nearly the ratio of increment, if we except the last 10 deg. which is evidently erroneous. Now, it is not a little remarkable, that the same ratio of increment, extended to 600 deg. gives an elasticity coinciding very nearly with the result of my experiment. Thus,

300° gives an elasticity of 147 inches of mercury.

350 252

400 382

450 537

500 717

550 922

$$600 \times 96 = 57600 \text{ lbs.}$$

Copy of Mr. Stevens's Patent and Specification.

To all to whom these Presents shall come, greeting:

I certify that the annexed writing is a true copy of the specification of a patent granted to John Stevens, duly compared with the original on file in this office.

In faith hereof, I, James Madison, Secretary for the Department of State of the United States of America, have (L. S.) signed these presents, and caused the seal of my office to be affixed hereto, at the city of Washington, this sixteenth day of January, A. D. 1805, and in the twenty-ninth year of the independence of the said States.

JAMES MADISON.

From a series of experiments made in France, in 1790, by Mr. Belancour, under the auspices of the Royal Academy of Sciences, it has been found that, within a certain range, the elasticity of steam is nearly doubled by every addition of temperature equal to thirty degrees of Fahrenheit's thermometer. These experiments were carried no higher than 280 degrees, at which temperature the elasticity of steam was found equal to about four times the pressure of the atmosphere. By experiments which have lately been made by myself, the elasticity of steam at the temperature of boiling oil, which has been estimated at about 600 deg. was found equal to upwards of 40 times the pressure of the atmosphere.

To the discovery of this principle or law, which obtains when water assumes a state of vapour, I certainly can lay no claim; but to the application of it, upon certain principles, to the improvement of the steam engine, I do claim exclusive right. It is obvious that, to derive advantages from an application of this principle, it is absolutely necessary that the vessel or vessels used for generating steam should have strength sufficient to withstand the great pressure arising from an increase of elasticity in the steam. But this pressure is increased or diminished in proportion to the capacity of the containing vessel. The principle then, to which I claim exclusive right,

consists in forming a boiler by means of a system, or combination of a number of small vessels, instead of using, as in the usual mode, one large one; the relative strength of the materials of which these vessels are composed increasing in proportion to the diminution of capacity. It will readily occur that there are an infinite variety of possible modes of effecting such combinations; but, from the nature of the case, there are certain limits, beyond which it becomes impracticable to carry our improvements. In the boiler I am about to describe, I flatter myself the improvement is carried nearly to the utmost extent the principle is capable of.

Specification.

Suppose a plate of brass, of one foot square, perforated by a number of copper tubes of an inch diameter and two feet long, the other ends of which to be inserted, in like manner, into a similar plate of brass: the tubes, to insure their tightness, to be cast in the plates. These plates are to be closed at each end of the pipes by a strong cap of cast iron or brass, so as to leave a space of an inch or two between the plates and their respective caps. Screw bolts pass through the caps into the plates. The necessary supply of water is to be injected by means of a forcing pump into the cap at one end, and through a tube inserted into the cap at the other end the steam is to be conveyed to the cylinder of a steam engine. As the boiler now described embraces the most eligible mode that has yet occurred to me of applying the principle, it is unnecessary to give descriptions of boilers less perfect in form and construction, especially as these forms may be diversified in a thousand different modes.

(Signed) JOHN STEVENS.

Signed in presence of us,

JOHN KEESE,

CHARLES T. KEESE.

The patent is dated April the 11th, 1803.

MEDICAL INTELLIGENCE FROM THE BARBARY COAST.

On the Habitations and Dress of the Moors, Arabs, and Jews of Tunis, in Barbary; and on the local Origin of the Plague from their personal Uncleanliness and local Nuisances: In a Letter from Dr. George Davis, Surgeon in the American Fleet, to Dr. Mitchell, dated at Tunis, July 2d, 1804.

I have only to regret that feebleness of talent prevents my unfettering the weak and shameful prejudices of Eu-

ropean merchants and nosological physicians, with respect to that legitimate offspring of filth and nastiness, the plague. My professional capacity (which has been exercised for eighteen months among the Tunisians) has allowed me to penetrate into the inmost recesses of their habitations. Since my residence at Tunis, I have given much attention to the collection of facts: they enable me to form a tolerable history of the laws, customs, domestic economy, &c. &c. of these people. I trust that I shall ultimately render it not unworthy of the public attention; it may throw some light on this subject.

The better sort of the houses are built of a soft calcareous stone, plastered over with mortar, and white-washed. The greater part of their habitations are built with a composition of earth and sand, with a small portion of lime. All their terraces are made of earth, covered with mortar, which is beat with boards, and afterwards white-washed: there is not, however, one terrace in twenty which resists a strong shower of rain, and if of long duration, every apartment is two or three inches deep with water.

The ground floors are paved with tile, and frequently washed with water.

The form of their habitations is a square court surrounded with rooms, which are generally very long and narrow. The windows are made in the inside of this square court; are very small and few, which render their apartments extremely dark and difficult of ventilation. They tell you it is to correct the heat of the climate.

Vast numbers inhabit one house; and particularly the Jews, where each chamber has a separate family. For instance; a room forty feet by sixteen (with one little window) will accommodate a dozen people for kitchen, hall, and bed-chamber. Were there no other sources of nuisance than the effluvia from their bodies, this alone would be sufficient to engender disease. The Moors are not unclean in their apartments, but the Jews are incredibly filthy and nasty. The apartments of the women are kept in nearly the same state with those of the men.

Soap is manufactured here with oil, and plenty; the soft kind, which is generally used, is at a reasonable price; they are not however lavish of it—their woollen cloths are scoured with fuller's earth, imported from Morocco; and the Arabs substitute an inferior quality found here, with which they wash their coverings: it combines tolerably well with salt water. With respect to the poorer Moors, Jews in general, and Arabs, you

must not imagine their washings are from the principle of cleanliness, or that it is ever properly done; naturally indolent, necessity alone will drive them to such a toil, in order to destroy the vermin. Their *giupa*, dipped two or three times in a puddle of stagnant water, or the sea if nearer, and stamped a few moments with the feet, is a complete washing, and will serve for a month or two. The *giupa* is a long robe, enveloping the whole body, generally made of woollen, and is the only covering of the inferior Moorish women and Bedouins.

The rich Moors are particularly neat in their dress, and clean in their persons, changing very frequently their linen, and making great use of their baths, the greatest of their luxuries. The poor are very filthy, ragged, and lousy; only a small proportion of the Moors (and those inhabitants of cities) enjoy the luxury of a mattress, which is made of wool and linen; the greater part sleep on a straw mat, without any covering; the poor, and Arabs in general, use their burnouse or haïck for a bed and covering. The nuisance and dirt from houses are carried away about once in ten or fifteen days on mules, and deposited at a small distance from the city, or flung into the lake, which is about two hundred yards from the city walls. Their excrements are conveyed by channels to ditches, which empty themselves into the lake, but which, at all times, emit most disagreeable effluvia; and these are opened from time to time to be cleaned, which is done by flinging in a quantity of dung, dust, or sand, and their contents carried on animals, and deposited at the borders of the lake.

The generality of the Moors live miserably poor; olives, black bread, oil, and coarse couscousu is their common food. In the fruit season, they are regaled with melons, figs, and the fruit of the prickly pear, of which they eat an enormous quantity; diarrhoea and dysenteries consequently are prevalent every summer. The usual hour of eating is after sun-set; they seldom take any thing in the course of the day.

The local situation of Tunis is unquestionably such, as will ever put in action the latent causes of disease, and give violence to the type of all epidemics. If a town, consisting chiefly of mud-houses, built very close together, without any, or very partial, means of ventilation, crowded with immense numbers of filthy inhabitants, with very narrow dirty streets (*in each of which, at all times, a putrefying carcase is observed*), which, after a little rain, are at least two feet deep with mud, is capable of engendering pestilential poison, such is the position of Tunis. But in order that these causes may be rendered more active, the

lake of Tunis, which is nine miles in breadth, (with a few feet water) emits incessantly most noxious and destructive exhalations; its borders are at all seasons of the year covered with the *rotten carcases of horses, dogs, mules, &c.* as well as those of fish; and in case of a dry winter, and consequent warm summer (such as we at present experience), the immense numbers of putrefying fish, extending nearly a quarter of a mile every way into the lake, send forth such noxious effluvia, as to force the inhabitants of the city to close their windows (*or rather air holes*) and doors, and rather breathe the infected air of close chambers than that of the *town atmosphere*. There certainly is no specific contagion in the plague, at least as it appears in Barbary; and which assertion shall be supported hereafter by undeniable facts. To give some encouragement to the *nosologists*, *I will say it is increased, and, perhaps, put in action by fomites; by living fomites, the Jews*, of whom we number 30,000 in this city, and who certainly occupy a less space than 3,000 inhabitants in any town in the United States. They all appear to be affected *with hydrophobia*; at least their extreme antipathy to water induces me to suspect so.

NEW MINERAL SPRING IN VIRGINIA.

Near Harrisonburgh a spring of water has lately been brought into notice by David Holmes, Esq. It has been the subject of a communication from Dr. Prachey Harrison to the Harrisonburgh literary society. It rises on the land of Mr. Taylor, and is warmer than other springs in the same neighbourhood; for while springs of common water are at 54 deg. he affirms this to raise the mercury to 62 deg. Small bubbles of air are constantly issuing through the water. It is perfectly fair and transparent; and possesses no smell, and scarcely any taste. Dr. Harrison has made some experiments to prove this gas to be CARBONIC ACID; but they seem more plainly to prove the presence of AZOTIC, or rather perhaps atmospheric air. From the pleasant temperature of the waters and the constant transmission of air bubbles through it, there seems to be a great similitude between it and the celebrated waters of Lebanon Springs, in New-York. And if so, the invalids who frequent it may expect to have a bath both pure and invigorating; as the quantity of water is so considerable, as, with an adequate fall, to drive an overshot mill-wheel.—See *Winchester Independent Register* for Nov. 20, 1804.

PLANS OF LOWER LOUISIANA AND NEW-ORLEANS.

Two works are in hand by John L. Bouquet de Moiseri, illustrative of the country near the southern streams of the Mississippi. One of them is a map of the country lying between the city of New-Orleans and the Bayou St. John, exhibiting the fortifications, suburbs and other remarkable things. The other is a view of the city of New-Orleans and its environs, as far as lake Pontchartrain, displaying all the principal and remarkable buildings, the *place d'armes*, and the rest of the public works. The publisher, who is a resident of the land which he describes, and is by profession a designer and engraver, has been engaged six years in collecting the materials of the two charts which he offers to the public.

OFFICERS OF THE MEDICAL SOCIETY OF NORTH-CAROLINA, 1804-5.

The Medical Society of North-Carolina met in Raleigh on the 10th, and after transacting the ordinary business of the meeting, adjourned on the 12th of December, 1804, to meet at Chapel-Hill on the 5th of July next. The following gentlemen were elected officers for the ensuing year:

Dr. JOHN C. OSBORN, *President*.

RICHARD FENNER, *Vice-President*.

ROBERT WILLIAMS, } *Censors*.
JAMES WEBB, }

CALVIN JONES, *Secretary*.

ELIAS HAWES, *Treasurer*.

NEW PUBLICATION BY DR. PATTERSON.

Dr. William Patterson, of Londonderry, in Ireland, has lately transmitted to Dr. Miller, a new work, just published, which is entitled, "*Observations on the Climate of Ireland, and Researches concerning its Nature, from very early Periods to the present Time, with Thoughts on some Branches of Rural Economy, particularly recommended in an Address to the Inhabitants and Friends of this Country.*" To this work Dr. Patterson has prefixed "*Preliminary Considerations on the Structure and Functions of Plants—on the Analogy between the Vegetable and Animal Systems—on the general State of Woods and Plantations in Ireland, in ancient and modern Times—on peculiar Circumstances denoting the various Conditions of her Linen Manufacture throughout a Series of Ages—and on the Utility of the Co-operation of Art and Science in every Work wherein their joint Labours*

are required." The usefulness of this work will recommend it, we hope, to general perusal; but the importance of it to the country of which it undertakes more immediately to treat, and many of whose essential interests are ably discussed in it, must there undoubtedly secure universal attention.

FOREIGN.

DECOMPOSITION OF COMBUSTIBLE SUBSTANCES.

MR. WINSOR, the patentee of the new Coke, is every Monday, Wednesday, and Friday, exhibiting the curious and very beautiful effects of this new discovery, at the Lyceum, in the Strand. To the economist, as well as to the natural philosopher, the exhibition will be deemed of the utmost importance. Mr. Winsor demonstrates very satisfactorily, to those who are at all acquainted with the principles of chemistry, that all combustible substances, such as the wood and coal which we commonly use, will yield, at a small expense, five costly products, viz. oil, pitch, acid, coke, and inflammable gas: that the latter product alone not only, when properly managed, furnishes the *most intense heat*, but the purest light. Hence he infers, and apparently with great justice, that the discovery must, if properly encouraged, be the most prolific source of the wealth of nations.

[*Lond. Month. Mag. for Nov. 1804.*]

Some additional light may be thrown upon this intelligence by adverting to the following account of an enrolled patent, which we find in the number of the same work for September last.

Mr. Frederick Albert Winsor's Patent for an improved Apparatus for the extracting Air, Oil, Tar, &c. from, and reducing into Coke and Charcoal, all Kinds of Fuel.

This apparatus is a sort of stove, constructed so as to reduce, by means of heat, all kinds of raw fuel into coke and charcoal, with a small consumption of the fuel. And the smoke is conducted into a condenser, where it undergoes a natural resolution into tar, pitch, oil, acid, ammonia, and inflammable air. Thus, by carbonizing raw fuel with heat instead of burning it, the whole weight is preserved, and resolved into the said products, or some of them.

This principle of carbonization may be applied, *first*, to

heat any vessel by the construction of such a carbonizing utensil; *secondly*, to heat another vessel by the hot smoke extracted from raw fuel; *thirdly*, to heat another vessel by the inflammable gas; and, *fourthly*, to heat a fourth vessel with the coke or charcoal saved by this principle of carbonization; and also for applying the charcoal in manufacturing gunpowder as containing much more strength; and the pitch and tar so produced retaining all its oily virtues, (lost by evaporation in all other methods) being superior in quality, may be used and applied to preserve vessels, buildings, railings, &c. exposed to the weather. The vegetable acid may be used in manufacturing alum, and other substances, and in calico printing, dying, and tanning. The ammonia may also be applied in tanning, dying, fixing colours, or staining. It may also be crystallized into sal-ammoniac, camphor, &c. The acids and ammoniac mixed with the tar, and properly applied, will prevent timber from rotting, preserve it from the dry-rot, and even prevent any conflagration from fire, by reason of the inflammable gas being extracted. It will operate as a preventative against infections of the air. The inflammable gas being separated from the carbon, may be led through tubes to any distance to produce light and heat. This principle of carbonization, and preserving inflammable air from smoke, is applicable to all public and private illuminations, light-houses, telegraphs, &c.

Observation. We cannot help thinking that Mr. Winsor should have described the construction of his stove, and by what means he condenses the smoke, and separates the several substances enumerated in the specification, to have made his title to the invention indisputable. [*Mag. for Sept.*]

MR. BUCHHOLZ'S NEW METHOD OF PREPARING
EMETIC TARTAR.

Take of crystals of tartar, two pounds; glass of antimony, one pound and an half; let them be well pulverised, and mix them together. Then pour on the mixture a sufficient quantity of water to make a thick paste. Expose this mixture under a glass bell to the action of the solar rays for about a fortnight, during which time it must be agitated three or four times a day, and a little water added to replace that which evaporates, in order to keep the mass in the same consistency. The mass puffs up, and sulphurated hydrogen gas is disengaged. Flakes of an analogous colour to kermes are perceived, and the whole mass receives a red brown colour. At the end of

a fortnight, it is dissolved and washed with boiling water, and afterwards filtrated. The insoluble residuum amounts to about three ounces. On evaporating the liquor, two pounds and fifteen ounces of emetic tartar in fine crystals will be obtained. From Mr. Buchholz's experiments with the residuum and the crystals of emetic tartar, he concluded,

1. That the glass of antimony may be dissolved by the acidulous tartrate of pot-ash in the state of a paste, and at a middle temperature.

2. That it is only necessary to repeat the crystallization, in order to deprive emetic tartar of iron, and of tartrate of lime.

3. That silica is not found in all glasses of antimony.

4. That under certain circumstances, particularly through the assistance of other saline substances, the tartrate of lime dissolves in great quantity, and even crystallizes regularly.

5. That one part of crystallized emetic tartar requires about fourteen parts of distilled water of 10—12° Reaumur for solution, and not eighty parts, as some chemists have imagined.

6 That 100 parts of boiling water are capable of dissolving 53 parts of emetic tartar, when entirely free from tartrate of iron and tartrate of lime.

[*Med. and Phys. Journal.*

METHOD OF PREPARING GALLIC ACID, BY MR. FIEDLER.

Boil one ounce of galls in sixteen ounces of water till it is reduced to eight ounces; separate the extractive matter from the acid by mixing with the liquor as much of pure argil as would make two ounces of sulphate of argil, and after some time filtrate the liquor. According to the author, the tannin, the extractive matter, and all the heterogeneous bodies, will remain on the filtre, combined with the argil, while the gallic acid is dissolved in the liquor that passes through. [*Ib.*

METHOD OF TREATING MALIGNANT FEVERS.

Dr. Keutsch, a very able physician, resident in the Danish island of Santa Cruz and St. Thomas, in the West-Indies, has lately discovered a new method, and hitherto very successful, of treating the fevers of those islands, so fatal to Europeans. His process consists in frictions by oils. The first idea of this method he derived from the theory of Dr. Scheele, of Copenhagen, on the use of oil in the plague: a theory which is to be found printed in the work of Baldwin. Of eight soldiers that were entrusted to the care of Dr. Keutsch, six were happily delivered from the fever, at the end of twenty-four hours, by means of these frictions. They produced violent sweats, and always put a stop to vomiting. The Doctor, in some

heat any vessel by the construction of such a carbonizing utensil; *secondly*, to heat another vessel by the hot smoke extracted from raw fuel; *thirdly*, to heat another vessel by the inflammable gas; and, *fourthly*, to heat a fourth vessel with the coke or charcoal saved by this principle of carbonization; and also for applying the charcoal in manufacturing gunpowder as containing much more strength; and the pitch and tar so produced retaining all its oily virtues, (lost by evaporation in all other methods) being superior in quality, may be used and applied to preserve vessels, buildings, railings, &c. exposed to the weather. The vegetable acid may be used in manufacturing alum, and other substances, and in calico printing, dying, and tanning. The ammonia may also be applied in tanning, dying, fixing colours, or staining. It may also be crystallized into sal-ammoniac, camphor, &c. The acids and ammoniac mixed with the tar, and properly applied, will prevent timber from rotting, preserve it from the dry-rot, and even prevent any conflagration from fire, by reason of the inflammable gas being extracted. It will operate as a preventative against infections of the air. The inflammable gas being separated from the carbon, may be led through tubes to any distance to produce light and heat. This principle of carbonization, and preserving inflammable air from smoke, is applicable to all public and private illuminations, light-houses, telegraphs, &c.

Observation. We cannot help thinking that Mr. Winsor should have described the construction of his stove, and by what means he condenses the smoke, and separates the several substances enumerated in the specification, to have made his title to the invention indisputable. [*Mag. for Sept.*]

MR. BUCHHOLZ'S NEW METHOD OF PREPARING
EMETIC TARTAR.

Take of crystals of tartar, two pounds; glass of antimony, one pound and an half; let them be well pulverised, and mix them together. Then pour on the mixture a sufficient quantity of water to make a thick paste. Expose this mixture under a glass bell to the action of the solar rays for about a fortnight, during which time it must be agitated three or four times a day, and a little water added to replace that which evaporates, in order to keep the mass in the same consistency. The mass puffs up, and sulphurated hydrogen gas is disengaged. Flakes of an analogous colour to kermes are perceived, and the whole mass receives a red brown colour. At the end of

a fortnight, it is dissolved and washed with boiling water, and afterwards filtrated. The insoluble residuum amounts to about three ounces. On evaporating the liquor, two pounds and fifteen ounces of emetic tartar in fine crystals will be obtained. From Mr. Buchholz's experiments with the residuum and the crystals of emetic tartar, he concluded,

1. That the glass of antimony may be dissolved by the acidulous tartrate of pot-ash in the state of a paste, and at a middle temperature.

2. That it is only necessary to repeat the crystallization, in order to deprive emetic tartar of iron, and of tartrate of lime.

3. That silica is not found in all glasses of antimony.

4. That under certain circumstances, particularly through the assistance of other saline substances, the tartrate of lime dissolves in great quantity, and even crystallizes regularly.

5. That one part of crystallized emetic tartar requires about fourteen parts of distilled water of 10—12° Reaumur for solution, and not eighty parts, as some chemists have imagined.

6 That 100 parts of boiling water are capable of dissolving 53 parts of emetic tartar, when entirely free from tartrate of iron and tartrate of lime.

[*Med. and Phys. Journal.*]

METHOD OF PREPARING GALLIC ACID, BY MR. FIEDLER.

Boil one ounce of galls in sixteen ounces of water till it is reduced to eight ounces; separate the extractive matter from the acid by mixing with the liquor as much of pure argil as would make two ounces of sulphate of argil, and after some time filtrate the liquor. According to the author, the tannin, the extractive matter, and all the heterogeneous bodies, will remain on the filtre, combined with the argil, while the gallic acid is dissolved in the liquor that passes through. [*Ib.*]

METHOD OF TREATING MALIGNANT FEVERS.

Dr. Keutsch, a very able physician, resident in the Danish island of Santa Cruz and St. Thomas, in the West-Indies, has lately discovered a new method, and hitherto very successful, of treating the fevers of those islands, so fatal to Europeans. His process consists in frictions by oils. The first idea of this method he derived from the theory of Dr. Scheele, of Copenhagen, on the use of oil in the plague: a theory which is to be found printed in the work of Baldwyn. Of eight soldiers that were entrusted to the care of Dr. Keutsch, six were happily delivered from the fever, at the end of twenty-four hours, by means of these frictions. They produced violent sweats, and always put a stop to vomiting. The Doctor, in some

particular cases, rendered the virtues of the oil still more efficacious, by adding camphor to it. This discovery is, of course, very valuable, as the fever cured is precisely the same as that which has made such cruel ravages in St. Domingo. [*Ib.*]

A NEW AND CHEAP PAINT.

A new, cheap, and lasting paint has been lately invented, and successfully applied to gates, rails, and palisadoes: it is made of two quarts of skimmed milk, eight ounces of fresh slaked lime, six ounces of boiled linseed oil, two ounces of Burgundy pitch, and three ounces of Spanish white. The lime is to be slaked by dipping it in water, and then exposing it to the air till it falls to powder. Then mix it with the milk, adding the oil, in which the pitch has been dissolved, a little at a time. Stir it well with a wooden spatula, and add the Spanish white. Two coats are to be laid on with a painter's brush; the expense of which will be about a half-penny a square yard. [*Month. Mag.*]

OBITUARY.

For the following Account of the late Dr. YOUNG we are indebted to an Anonymous Correspondent.

ON Friday, the eighth of June, 1804, departed this life, at Hager's-Town, Maryland, JOHN R. YOUNG, M.D.* a young man of uncommon talents and great industry.

He had completed his medical education under the direction of Professor Barton, and graduated with more than an ordinary share of reputation, on the eighth of June, 1803; after which he returned to the place of his nativity, and succeeded his father in a very extensive practice. The fatigue which he was obliged to undergo in the discharge of professional duties, was more than his delicate constitution could long support. He had an hereditary predisposition to *phthisis pulmonalis*; but as he had never been warned of its approach by any premontory symptoms, his friends had reason to hope, that his judgment and skill would be sufficient to obviate the fatal disease. About the middle of April, during several days of cold damp weather, he underwent very great fatigue in the exercise of his profession, and contracted a slight indisposition. On the

* Very honourable mention was made of his Inaugural Dissertation, in the first Number of your second Hexade, page 161.

17th, after having rid all the morning in a cold *mist*, he returned at noon, and ate a hearty dinner, but felt some oppression at his breast, with cold extremities, and an inclination to sleep. He had sat by the fire but a few minutes, when a universal glow of heat was felt, and an irritation of the trachea, which excited a slight cough. A profuse hemorrhage from the lungs immediately commenced, and syncope succeeded. Upon reviving, the hemorrhage again appeared. Repeated venesection was used, and large quantities of muriate of soda administered. The hemorrhage gradually subsided, and on the *third day entirely* disappeared; but his pulse remained very full and elastic. He was bled ten times in as many days, and took digitalis without producing much effect. He had regular exacerbations of fever after the tenth day: during the paroxysm, his pulse indicated great irritability of the arterial system, was elastic and full, though not remarkably frequent; in the apyrexia, debility was extreme. The intermissions being complete, it was determined to use the bark, but no good effect was produced. He now complained of a pain in the left lobe of his lungs, for which he again had recourse to phlebotomy without any obvious advantage. Digitalis reduced the pulse for a short time, but a more violent arterial action always succeeded. Mercury was exhibited, but no ptyalism could be excited, though it relieved the pain in the breast. His fever continued with regular exacerbations, and a pulse indicating the highest grade of irritability to the last, notwithstanding every means was taken to overcome it. He died after violent spasms of an hour's duration, without ever having expectorated more than ordinary.

On the 10th his remains were committed to the grave, attended by a large and respectable concourse of people.

He was the only son of an aged and venerable parent.

APPENDIX.

REMARKS *on the Cow-Pox Inoculation.* By Mr.
CHARLES BRANDON TRYE.

[From the Medical and Physical Journal.]

WHEN Dr. Jenner first introduced Vaccine Inoculation, I declined adopting it. Inoculation with the small-pox I had long practised without a single loss; I had also fixed opinions in physiology, which militated against what was advanced

by himself and his friends. In process of time, however, such a mass of clear, undisputed, decisive evidence came forward in support of the newly-discovered preservative, as to be irresistible to a mind not hardened beyond the susceptibility of conviction; and, consequently, whatever might have been my previous notions, or my habits of thinking, I could no longer persist in the use of variolous matter.

I will not say, that my own practice, in inoculating with cow-pox matter, has been so considerable as that of many others, or that I have made a variety of experiments, with a view to understand or explain any of the phenomena of the disease; but I will say, that in the small-pox, both natural and inoculated, my experience has been ample; and from that experience alone, I *was* enabled to compare the merits of small-pox inoculation with those ascribed to the Jennerian practice. From *my own* experience, then, I can assert, first, that whatever *has been said against the sufficiency of cow-pock matter*, as a security against variolous infection, may be also *said with truth against small-pox matter*, as a similar security. From my own experience I can, secondly, assert, that the subsequent ill effects which *have been said to follow cow-pox*, have, in a ten-fold greater degree, followed small-pox. And, lastly, from my own knowledge, I can assert, (and who of long standing in the profession cannot do the same?) that many instances of mortality have happened in small-pox inoculation, whilst amongst *all which has been said*, not a single example appears of death from cow-pox.

In behalf of my first assertion, I can recollect numerous facts; but, as I write for the public, and on a most important subject, I will state nothing in support of that assertion, which shall rest solely upon my own credibility or memory; I will, therefore, confine myself to the three following cases:—

Mr. John Phillpotts, of this city, well known and esteemed in his profession of the law, was inoculated with the small-pox in his infancy, together with an elder sister, by their father, *with the same matter, at the same time*, and both were nursed by the mother, and two persons accustomed to small-pox, of good judgment, and now living. The young lady had the disease to an alarming virulence; the boy's arm inflamed, he was indisposed, and had four or five eruptions on different parts of his body; and Mrs. Phillpotts says, they appeared to her to go on after the manner of other small-pox pustules. In his twenty-first year, I was desired to visit him as being ill with some eruptive fever. He had spots just appearing in different parts of his body. The next time I saw

him, nothing but the positive assertion of himself and his friends, that he had had the small-pox, could have made me doubt that they were variolous. On the following day that doubt was entirely removed. He had a plentiful crop of pustules of the distinct kind, which went regularly through their stages of suppuration and scabbing.

In September, 1794, I inoculated a daughter of Mr. John Rudhall, of this city, with matter which *I had taken myself* from a variolous subject. The child's arm inflamed, she was indisposed, and had a few eruptions, which did not suppurate. About twelve months after, I inoculated her again, and she had then the distinct small-pox, with all its usual circumstances.

Mr. Cooke, an eminent apothecary of this city, desired me to see a patient, who had some years before been inoculated by a practitioner of respectability and experience, for the small-pox, together with ten others, in the Gentleman's own Small-Pox House. The patient supposed that he then received and went through the disease, and the inoculator assured him of it. When we visited him, he was then blind with small-pox, which went through its usual stages.

In support of my second assertion, I need not stake my own credibility at all. My experience can only coincide with the testimonies already before the public, of the small-pox rousing up scrophula in all its malignant varieties, and being followed by phlegmons, ophthalmias, &c. while nothing beyond cutaneous eruptions has, to the best of my recollection, been imputed to the cow-pox.

But as to my third assertion, its truth is so universally known, that all proof is unnecessary.

I shall go then to the inferences to be drawn from what has been premised. From the cases supporting the first assertion, it appears, first, either that some individuals may receive the small-pox infection twice, or else that the patient may be infected to a certain degree with variolous matter, but not so as to make an indelible impression on the constitution. In either case, their inoculation with the small-pox has no advantage as a protecting security over the cow-pox. Let it be said, that the practitioner who inoculated the patient supposed to be infected a second time, was, in the first instance, either inattentive or deceived by doubtful appearances; or that the first time his patient was not inoculated with real small-pox matter, or with small-pox matter in a proper state. To the first supposition, it must be answered, that in the general practice of cow-pox inoculation, it is not to be believed that

operators will be more sagacious, more discriminating, or more attentive than their predecessors have been in small-pox inoculation; and, to the second, that similar errors are just as likely to prevail in vaccine inoculation: so that the conclusion must be, either that there are individuals in whom the susceptibility of the small-pox is not destroyed by a well-conducted process either of the cow-pox or small-pox inoculation; or that, in the instances when either the one or the other failed to secure the individual against future small-pox, the process did not go so far as to make the proper impression on the constitution; or, lastly, that in the inoculation improper matter must have been used; *which, however, could not have been the case in the two first examples given above, in proving my first assertion.*

Three instances have been brought forward, amidst the voluminous writings for and against the cow-pox inoculation, where it failed of securing the patient against small-pox; two by Mr. Goldstone, of Portsmouth, and one in the London papers of the beginning of this month. Whether the patients were inoculated with genuine cow-pox matter or not, I will not inquire; I will admit their weakening our confidence in vaccination to a certain degree. But these three failures, amid the collected experience of the Profession in general, are here met by the experience of a single individual, in a provincial town, with an equal number of cases, equally weakening our confidence in small-pox inoculation. In this respect, then, let the two inoculations be supposed to stand upon equal grounds. But let the *consequences* of one be weighed against those of the other, and the scale of vaccination must incalculably preponderate. In immediate danger to the individual, in remote mischief to his constitution, the cow-pox has infinitely the advantage. To this let us add, that while with *the cow-pox* the practitioner, at the worst, injures no one except his patient, *with the small-pox* he may deal misery and destruction among his neighbours, far beyond the limits of his operating; that in the one he is continually risking the dissemination of a loathsome and mortal disease, while in *the other* he is conducing to the extermination of that pestilence from among mankind. Let us, then, turn to common sense, and ask her, which she would prefer?